

TOTAL COLIFORM AND BACKGROUND BACTERIAL RESULTS
FOR MUNICIPAL RAW WATER SUPPLIES

SOUTHEAST REGION OF ONTARIO

1992 ANNUAL REPORT

TD
227
057
T67
1992
MOE

KINGSTON REGIONAL LABORATORY
ONTARIO MINISTRY OF THE ENVIRONMENT
FEBRUARY 1993

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BY

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FEBRUARY 1993

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AGRY

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The graphs were produced by LOTUS MACRO PROGRAMS

written by

JIM LEY

Toronto, Ontario

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INTRODUCTION

This report summarizes the results for the bacterial analyses of municipal raw water supplies in the southeast region for 1992. All samples were submitted to the Kingston MOE Regional Laboratory for analysis.

Two of the most common and widely accepted methods used to determine the bacterial quality of raw and treated water are tests for total and fecal coliform bacteria. These analyses ensure that the treatment of raw water supplies has been sufficient and that the quality of treated water meets approved standards for safety.

The detection of indicator bacteria such as total coliforms in raw and treated water samples, implies the possible presence of contamination by pathogenic organisms. These organisms are natural inhabitants of feces, sewage, soil and sediments. Of these contaminants, sewage is the most serious threat to human health. Disease-causing bacteria and viruses can occur in sewage at levels exceeding millions of cell per gram. In addition many pathogens associated with fecal wastes can survive for months and years in water and can be readily transported by the water-borne route.

Raw water, regardless of its degree of contamination, can be treated to acceptable drinking water standards. For this reason there are no objectives for bacterial raw water quality. This approach, however, is not acceptable from many points of view, especially from an economic one as the cost of treating raw water of poor quality could be prohibitive and unsustainable. For this reason it is important to monitor the quality of the raw water as well as the treated supplies. A degradation in the quality of raw, source water, that is allowed to continue unchecked would eventually result in an increased cost for treatment.

The data in this report show the trend of raw water bacterial quality during 1992 for 86 municipal supplies in the southeast region. The results for total coliform and background bacteria are shown for each municipality. Total coliforms are determined on a m-Endo, standard culture medium. In addition to the coliform determination, m-Endo medium also recovers "background bacteria".

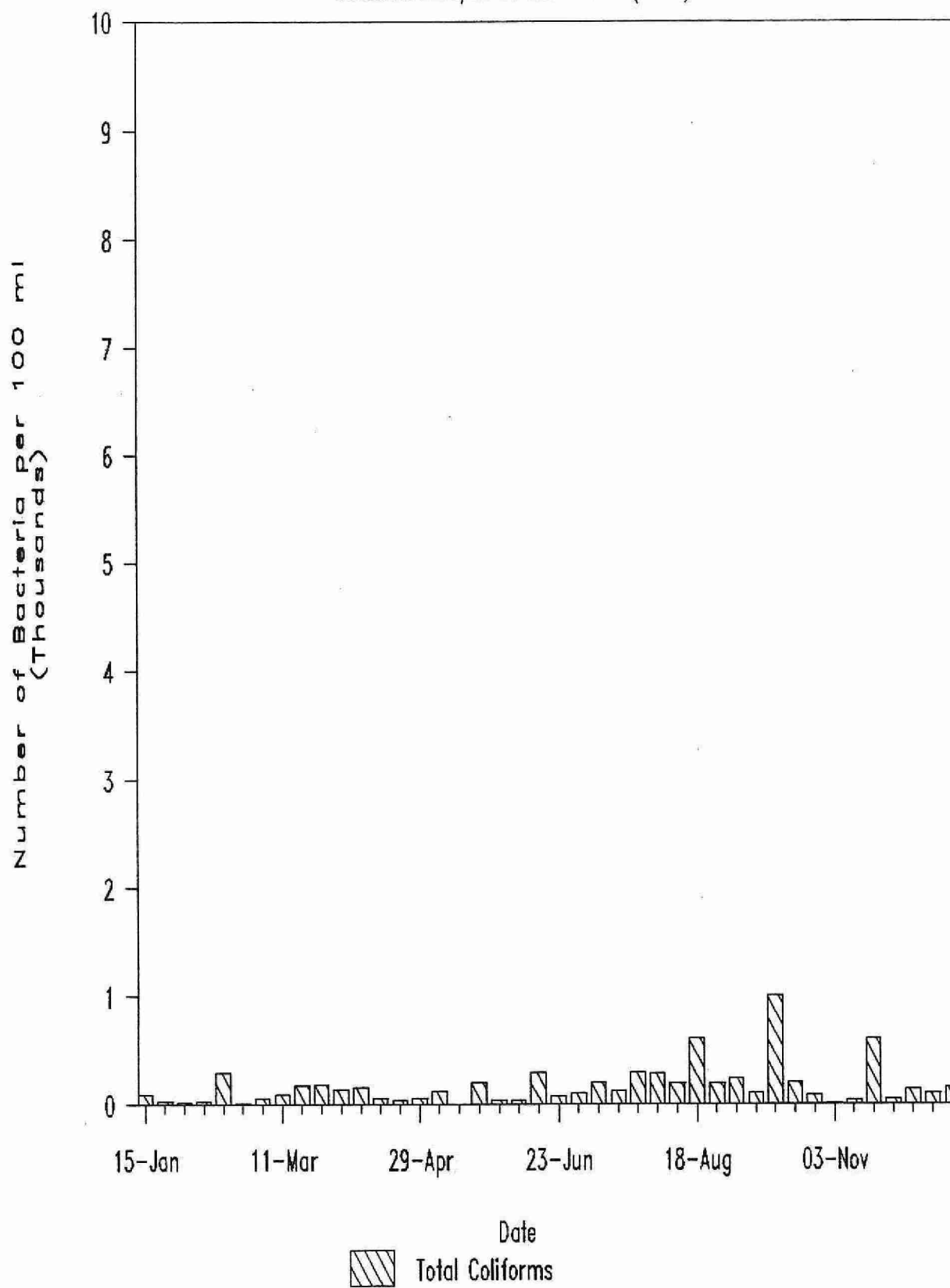
It is important to know the levels of background bacteria when a total coliform determination is being evaluated. High background levels, those exceeding 200 cells per 100 ML. for example, interfere with the growth and enumeration of total coliforms. Hence, if total coliforms are detected in the presence of high numbers of background bacteria, the water quality may be considerably poorer than the total coliform colony count suggests.

Kingston Laboratory
February 1993

ALEXANDRIA

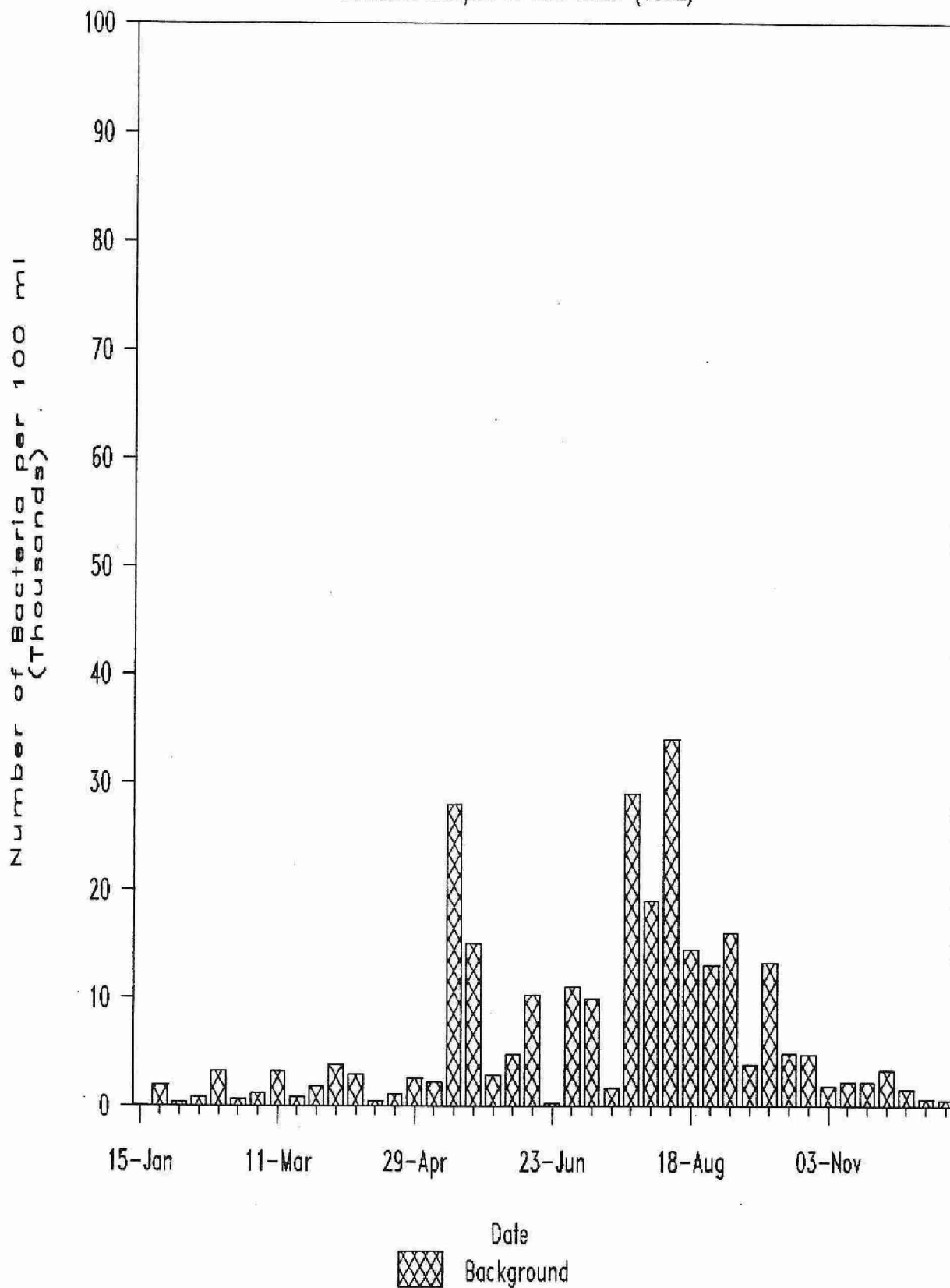
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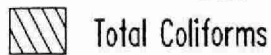
Bacterial Analysis of Raw Water (1992)



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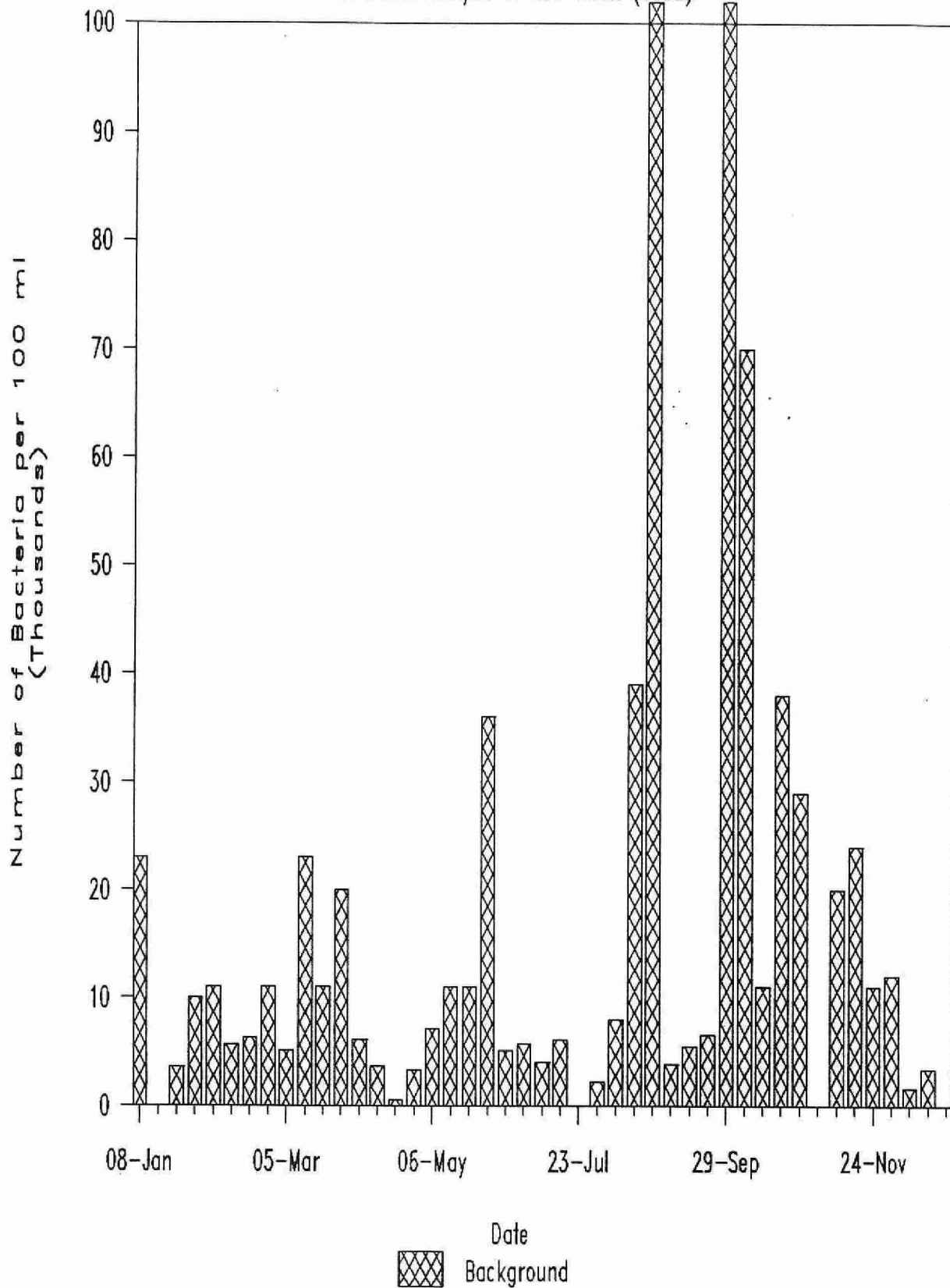
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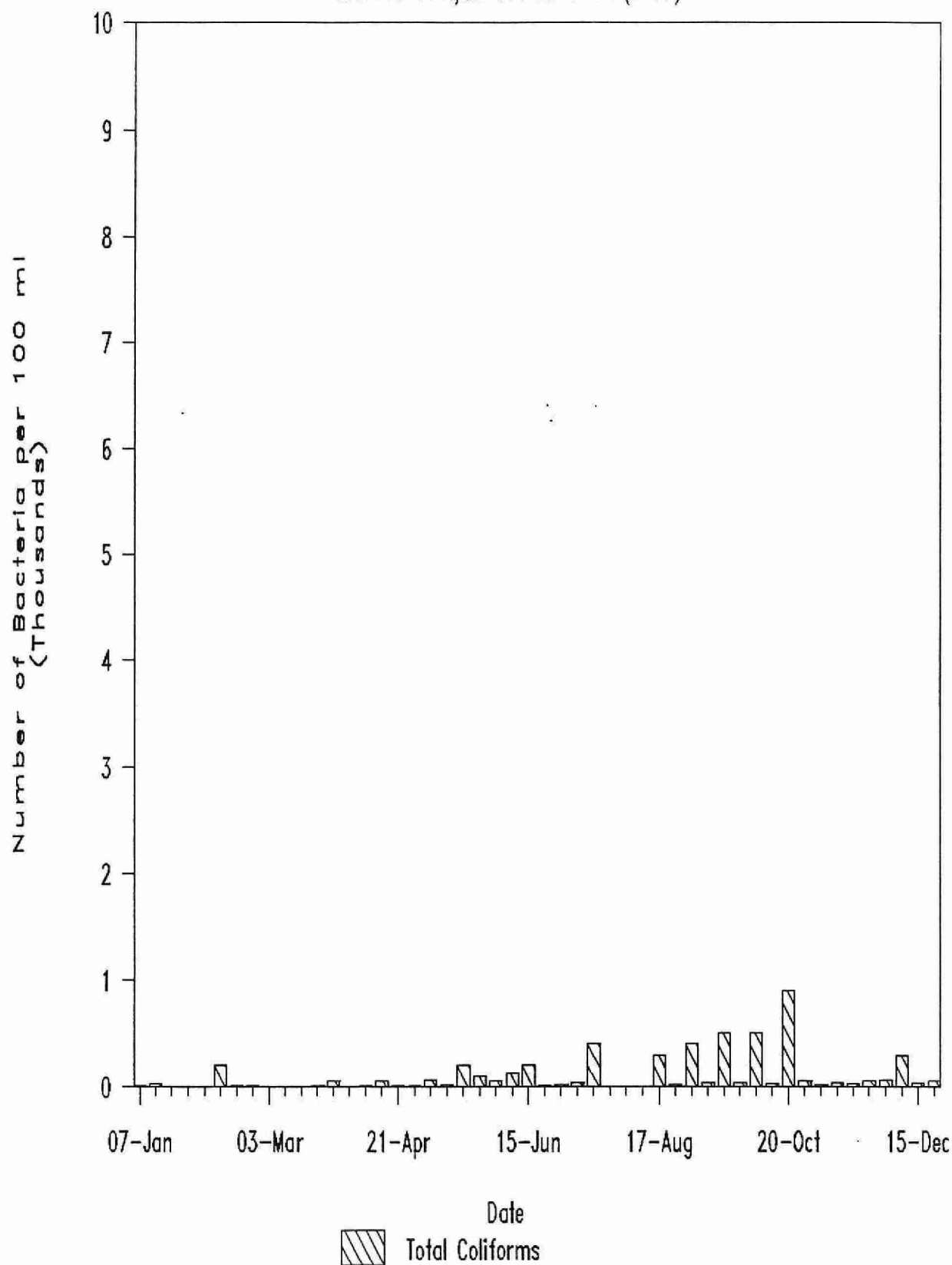
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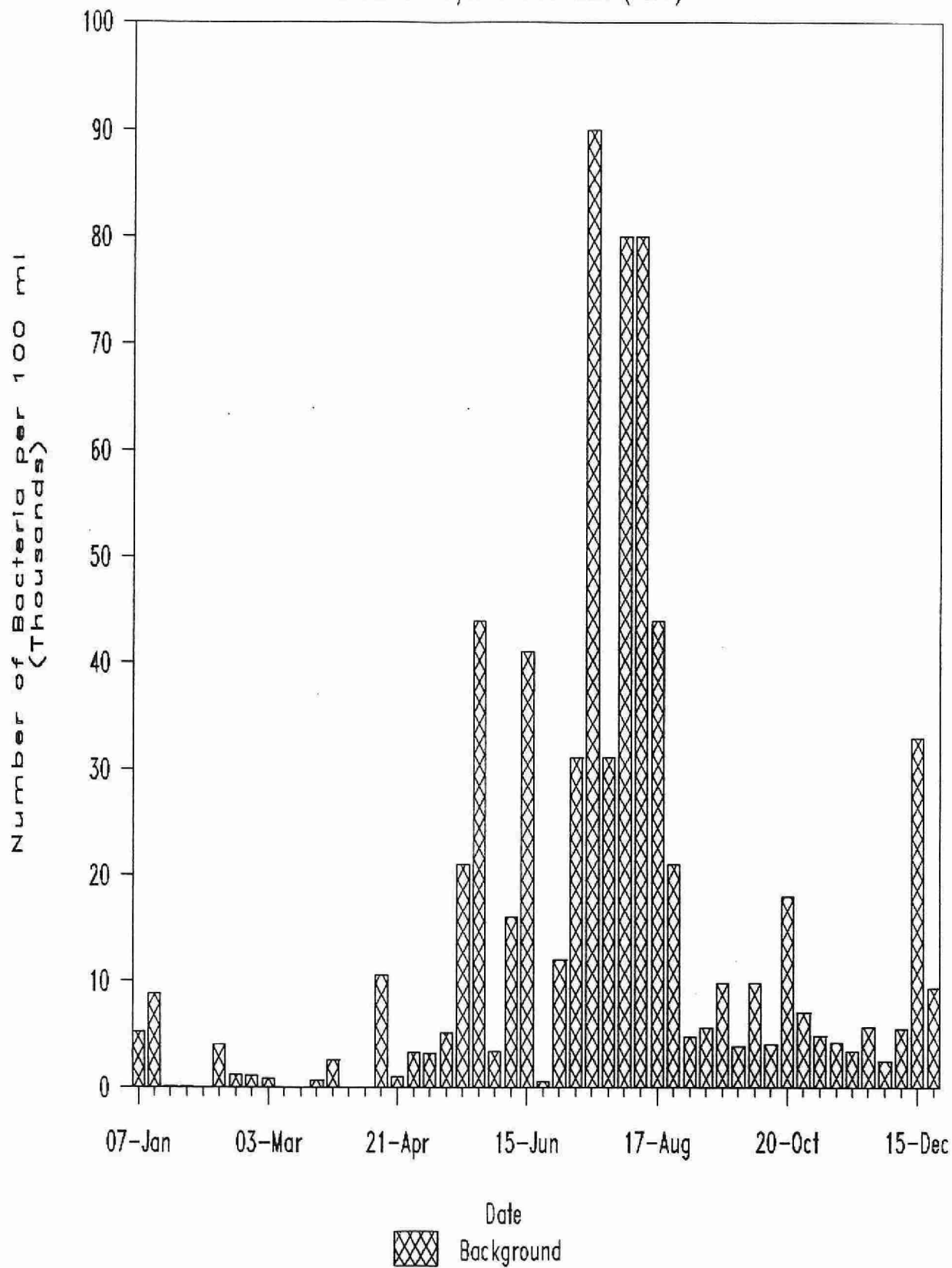
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Bacterial Analysis of Raw Water (1992)



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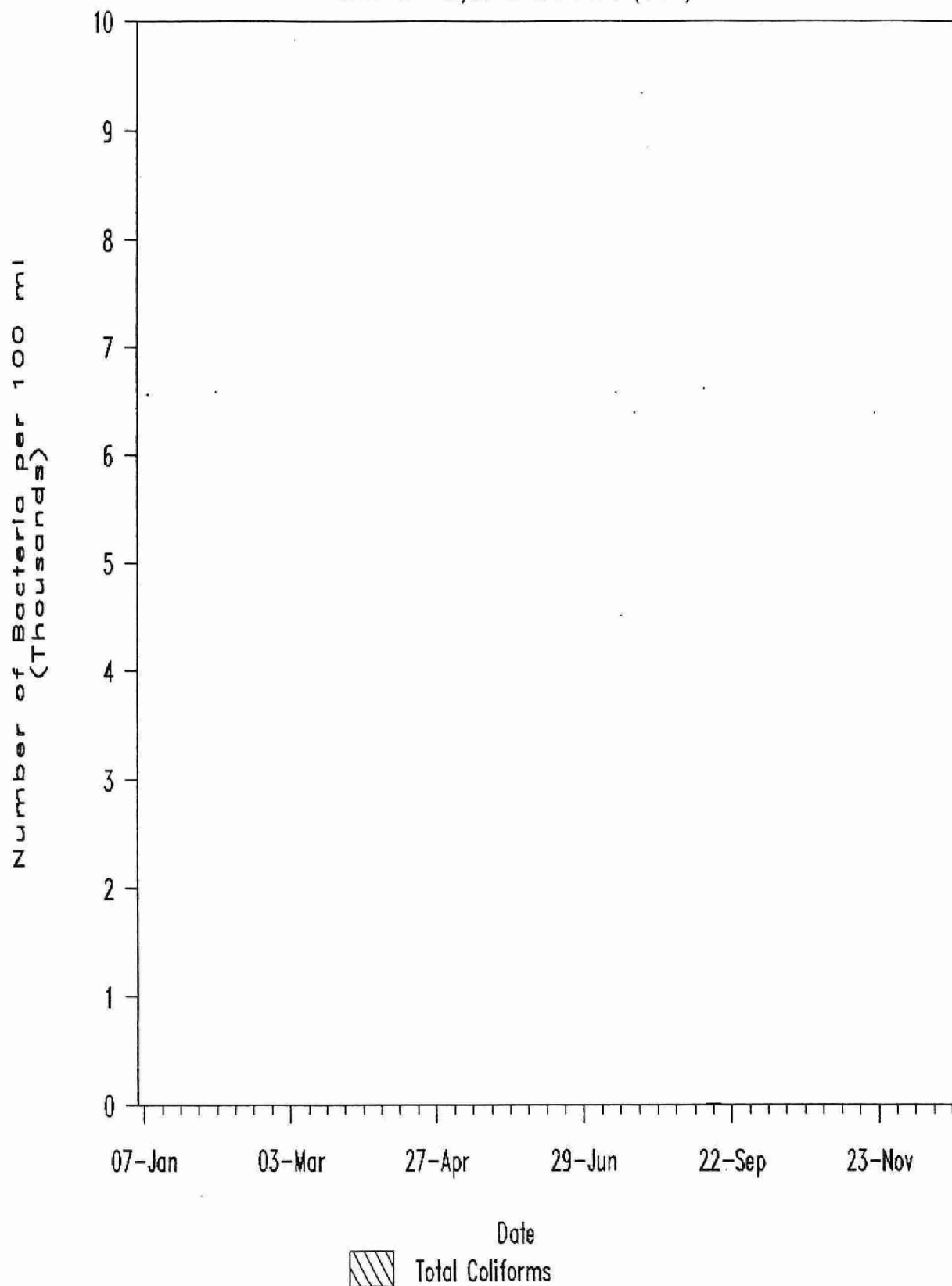
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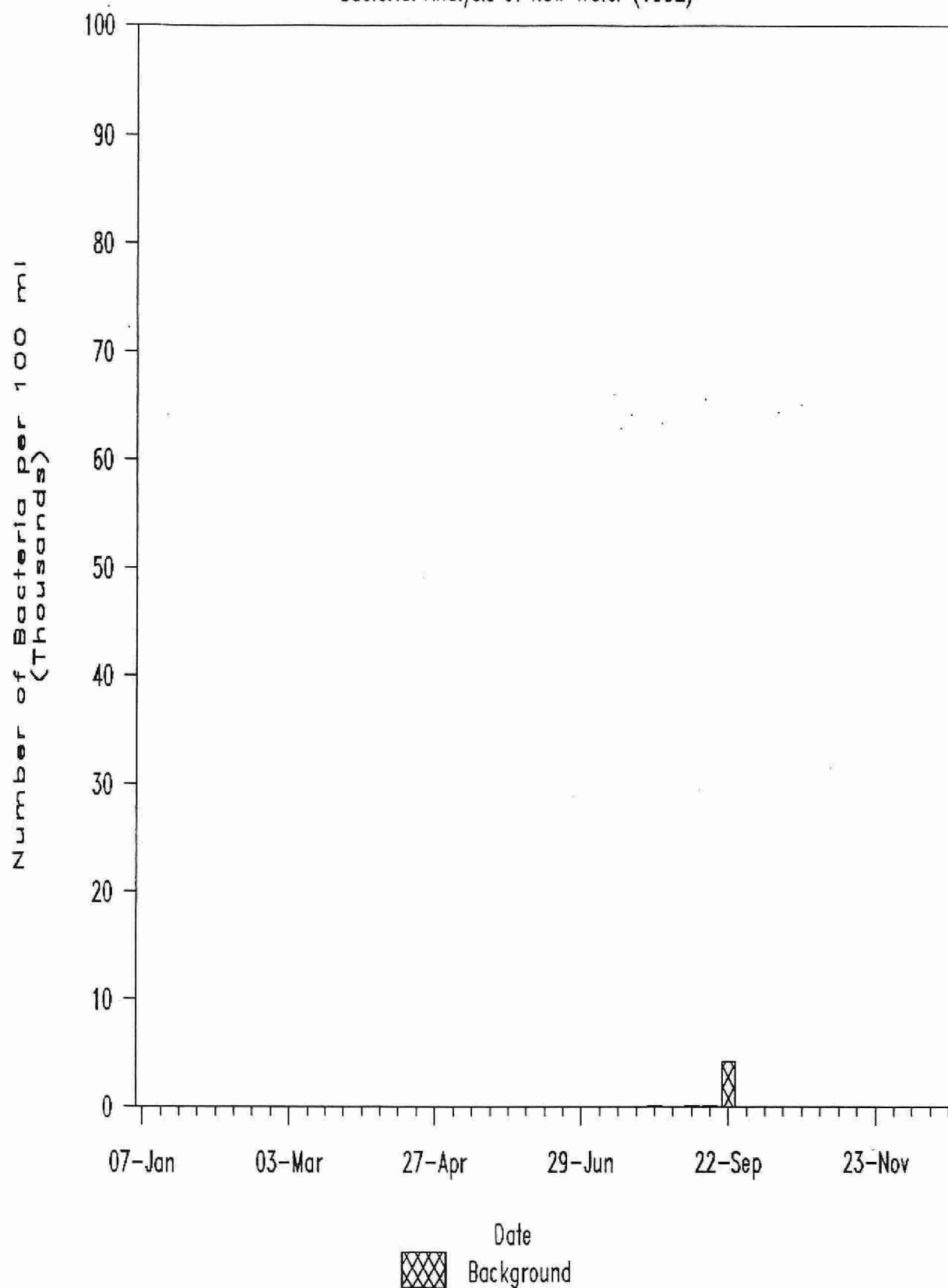
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Bacterial Analysis of Raw Water (1992)



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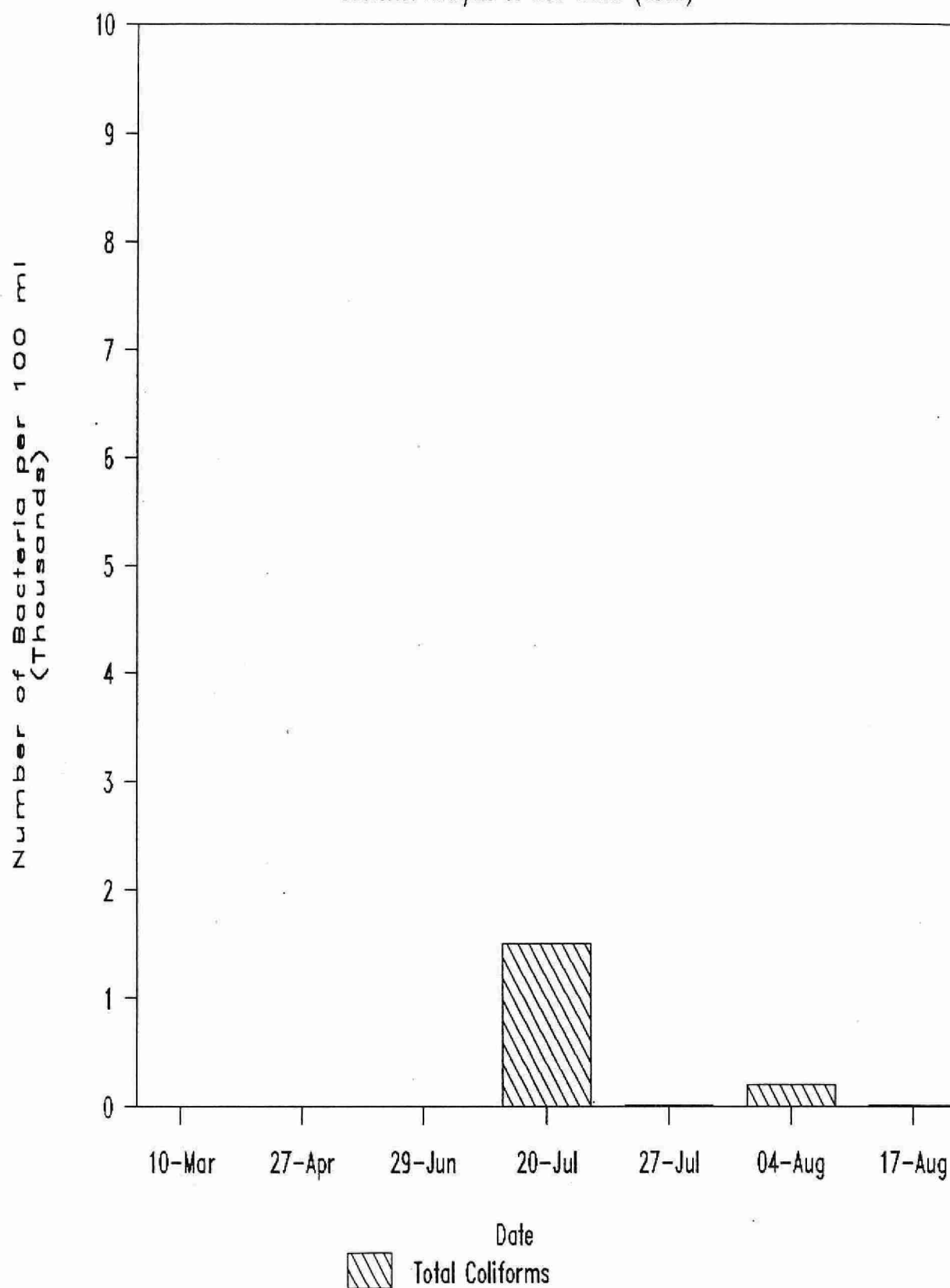
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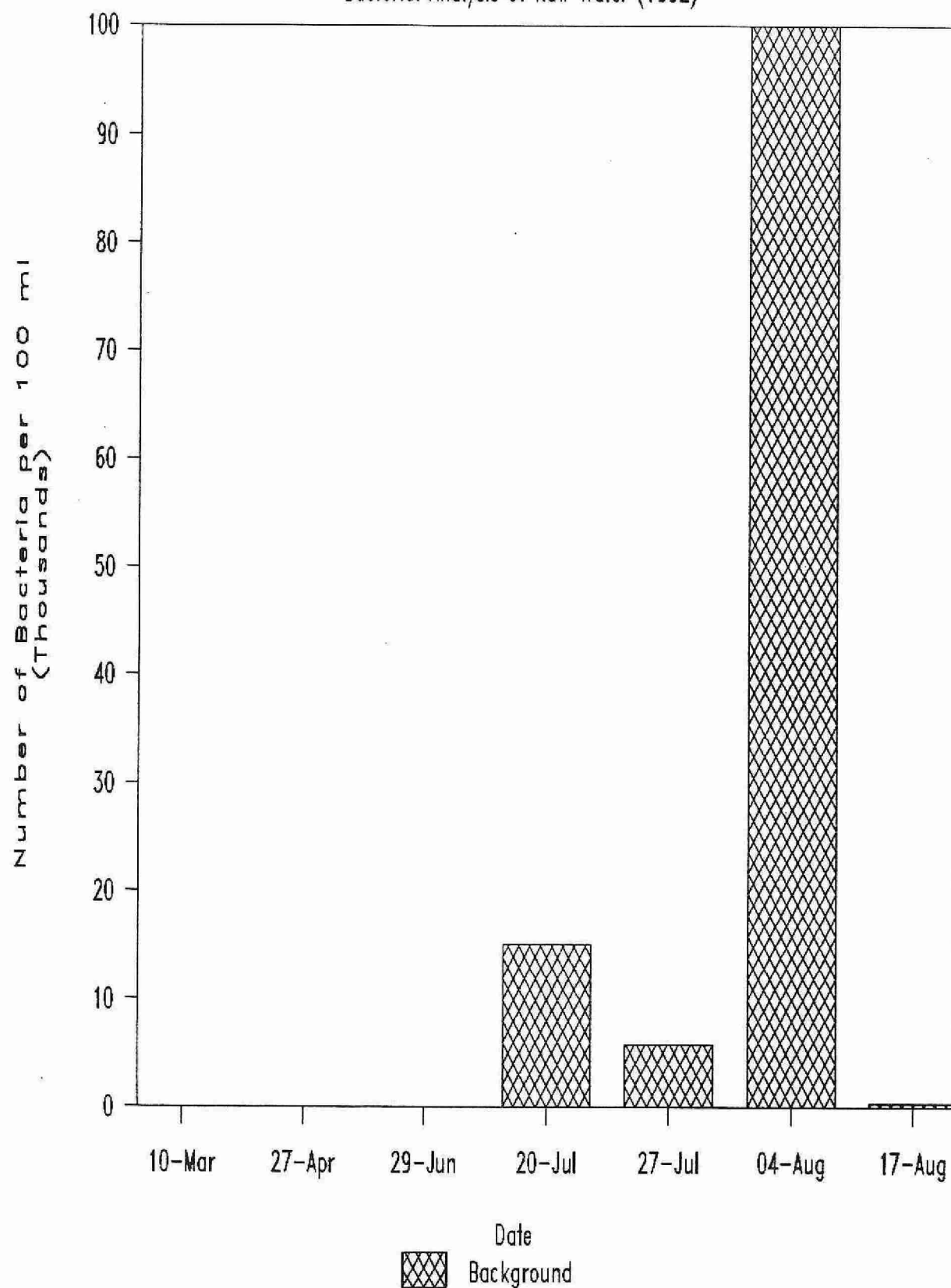
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Bacterial Analysis of Raw Water (1992)



AMELIASBURG (VILLAGE)

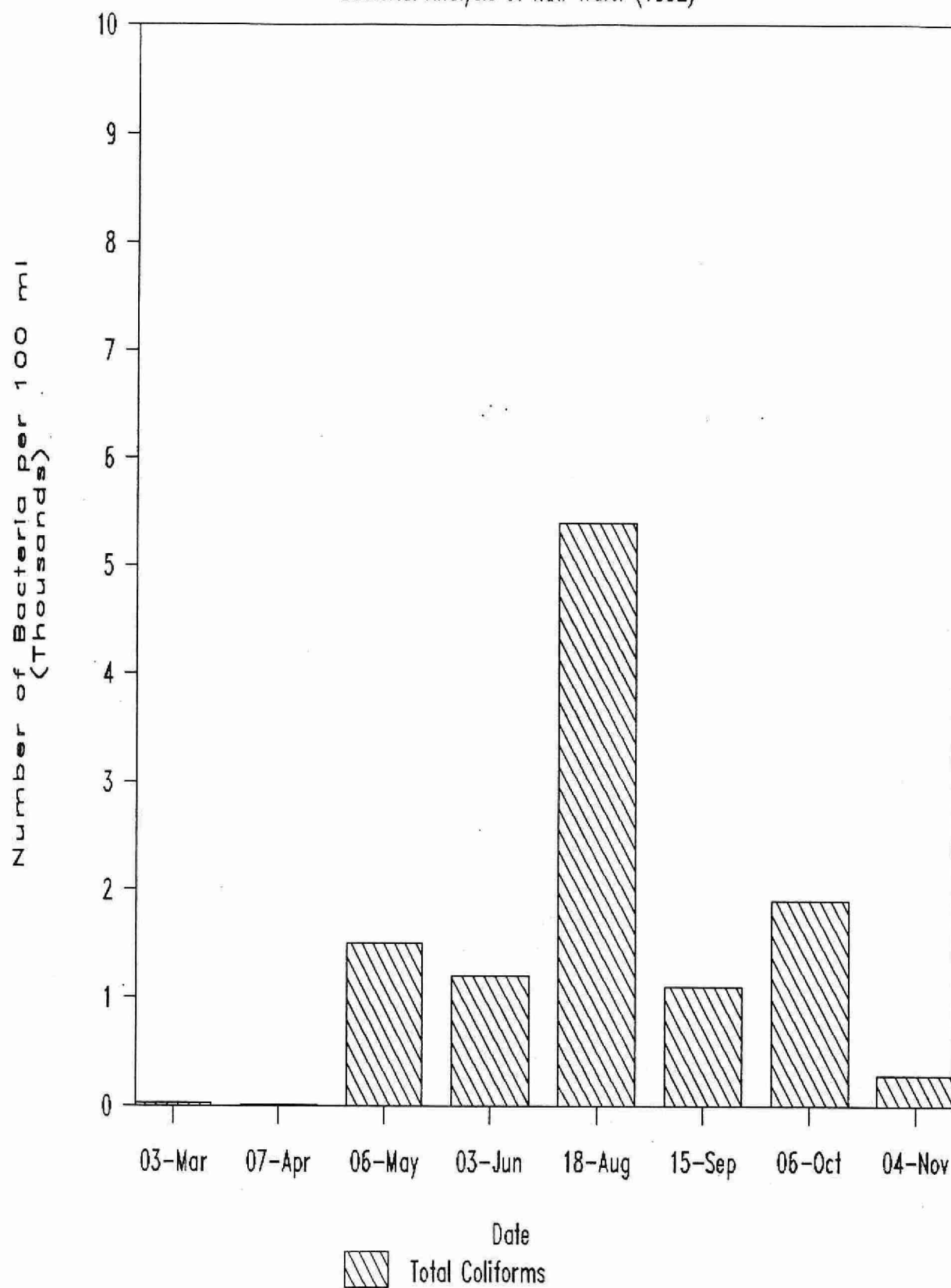
Bacterial Analysis of Raw Water (1992)



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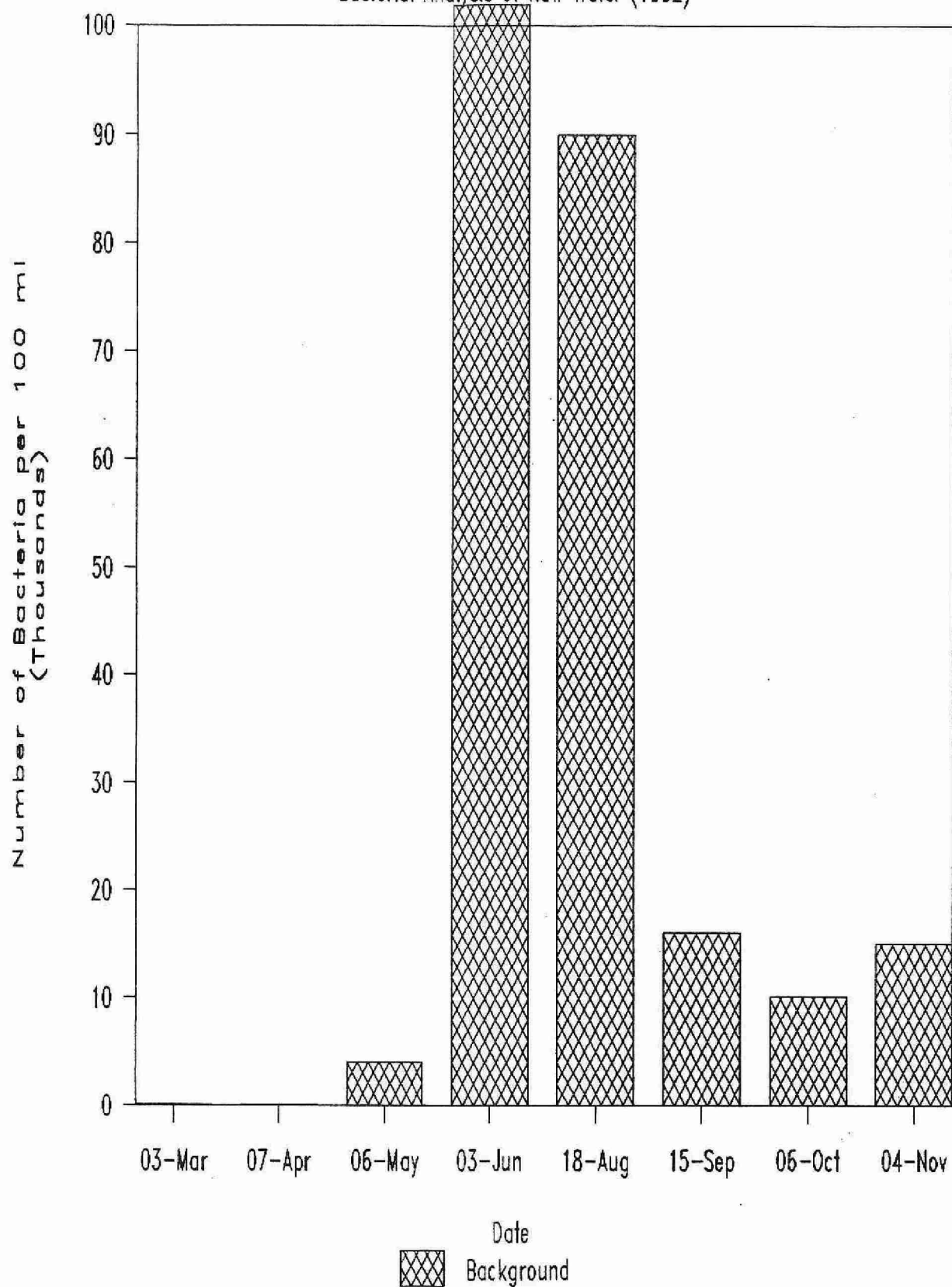
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Bacterial Analysis of Raw Water (1992)



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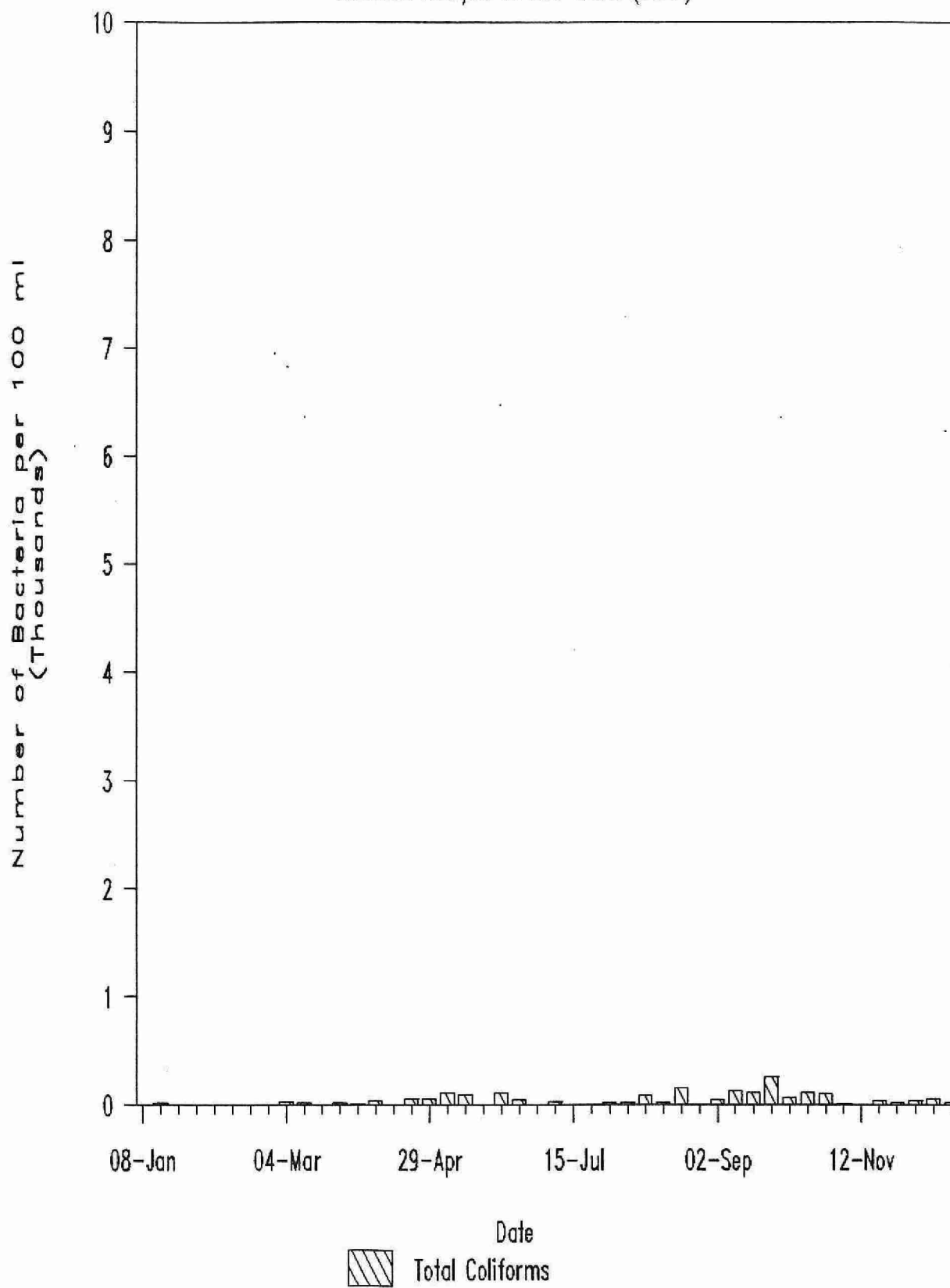
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BANCROFT

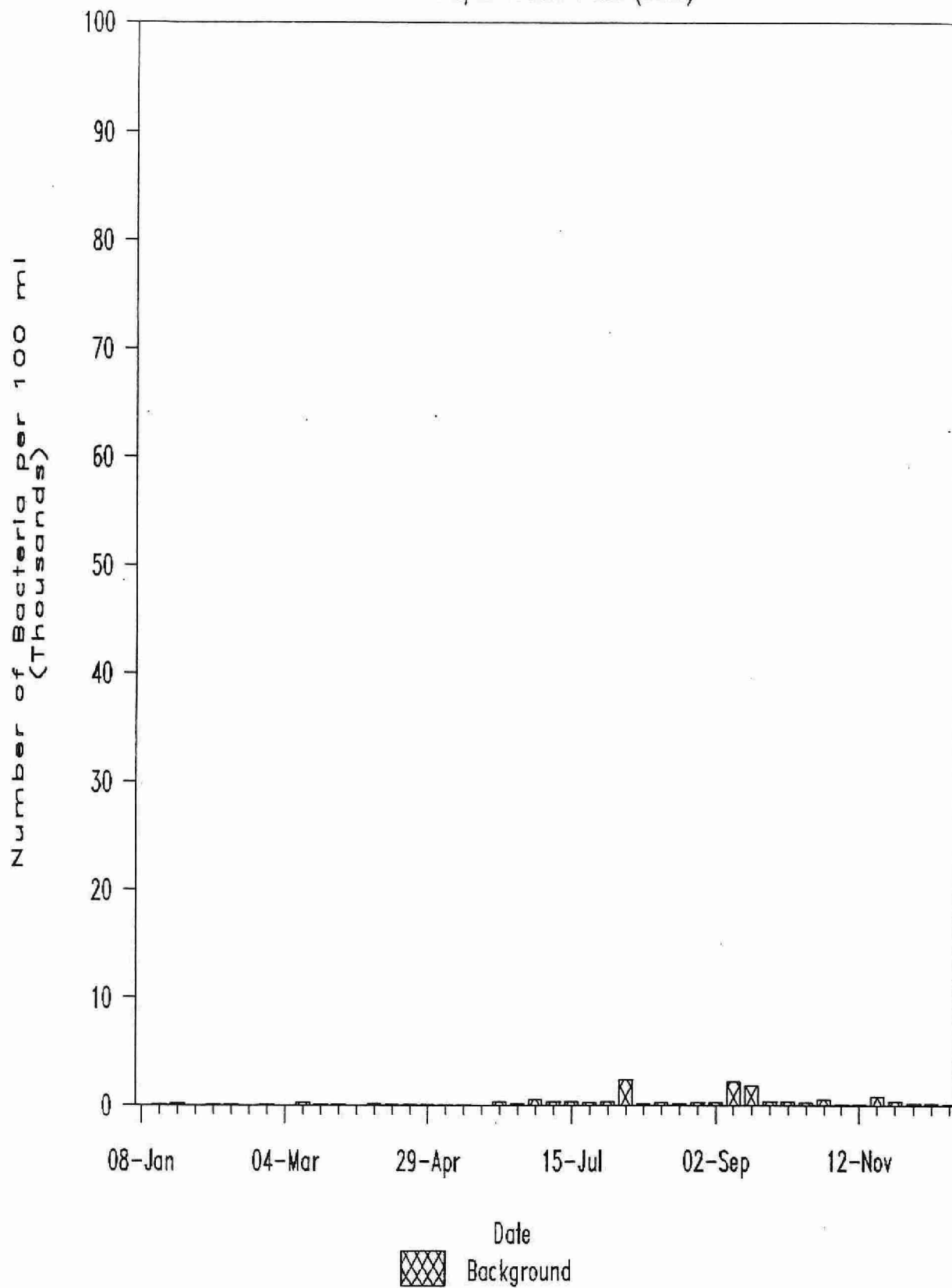
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Bacterial Analysis of Raw Water (1992)



BANCROFT

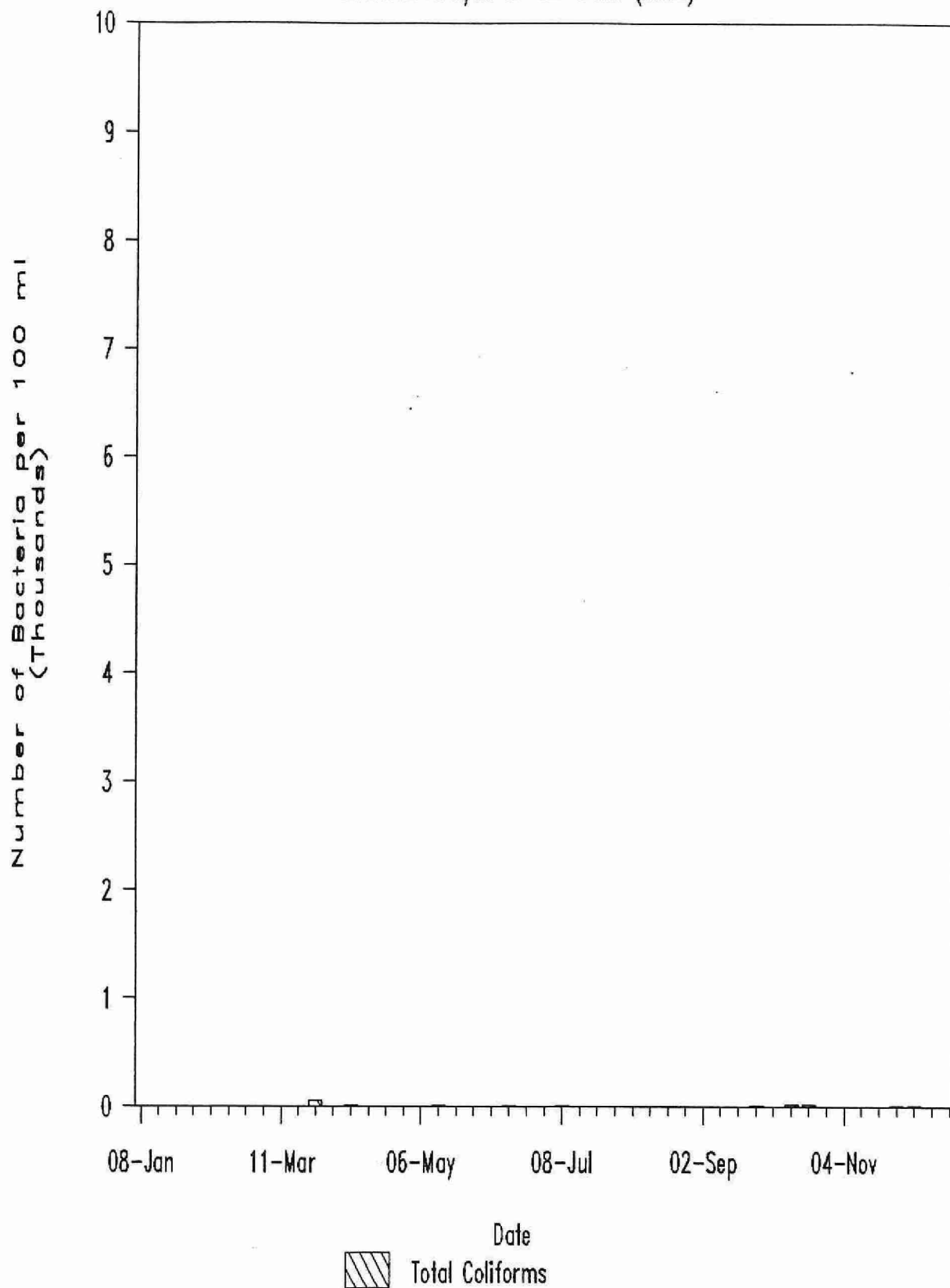
Bacterial Analysis of Raw Water (1992)



BARRYS BAY

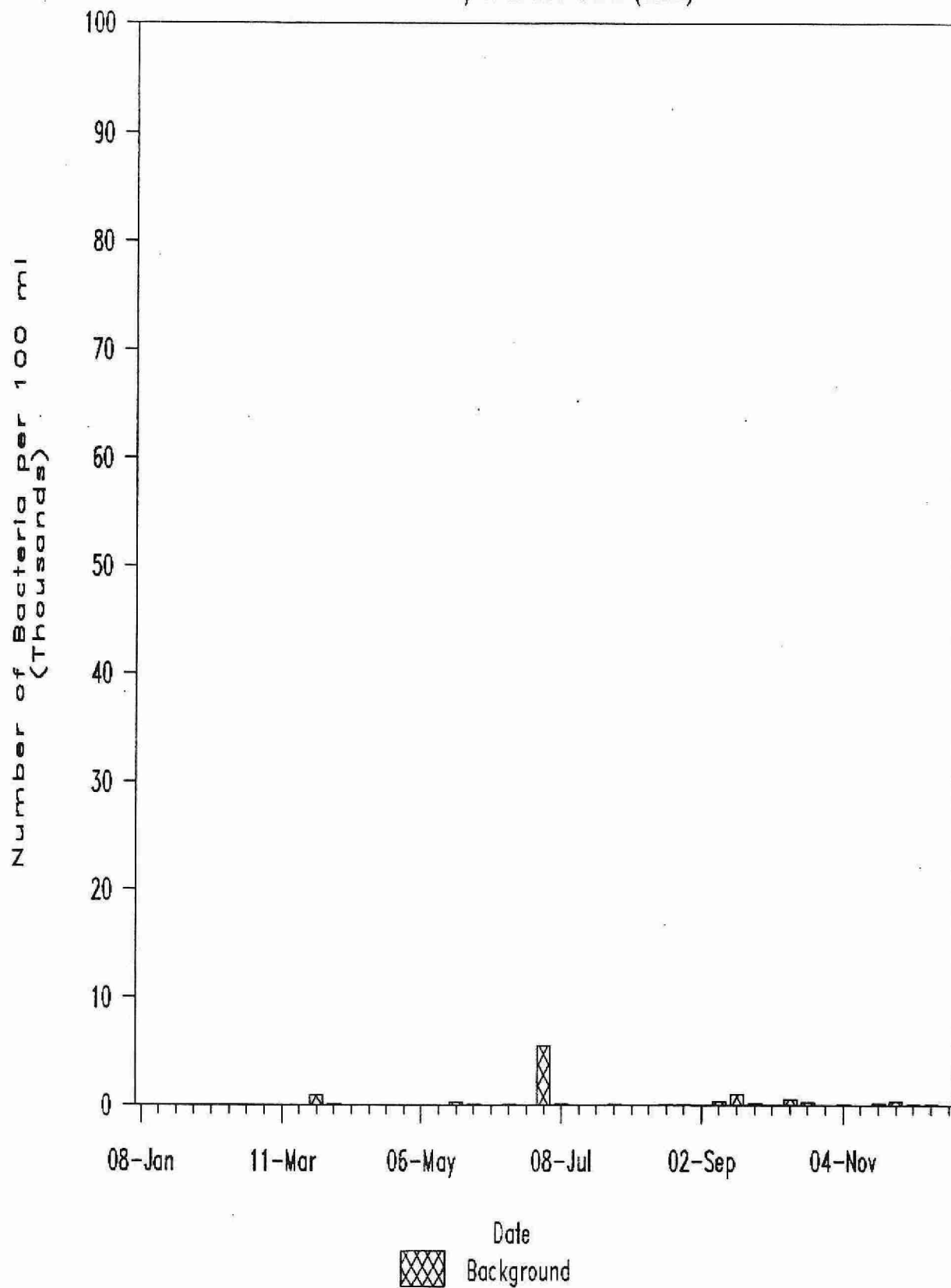
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Bacterial Analysis of Raw Water (1992)



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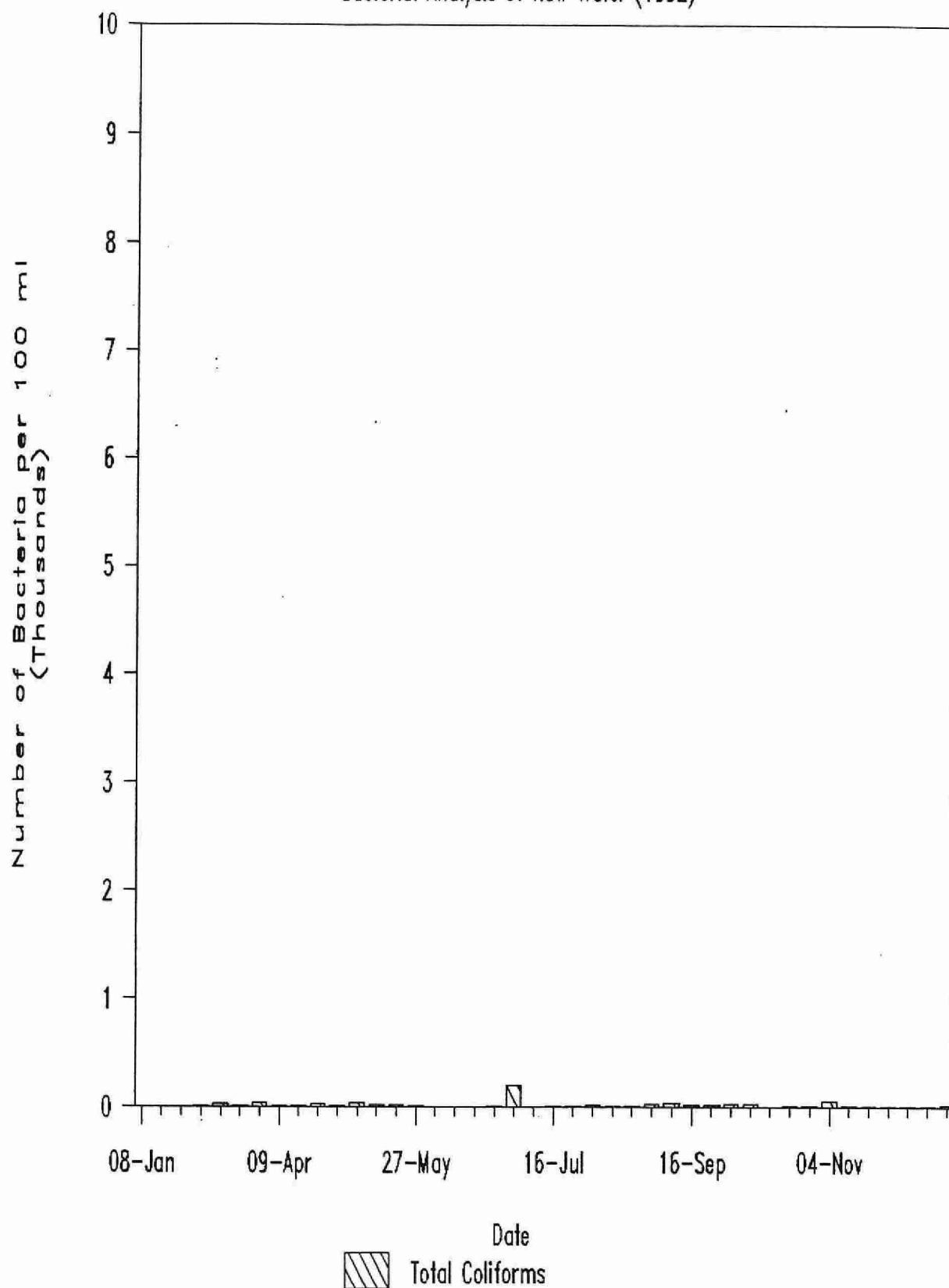
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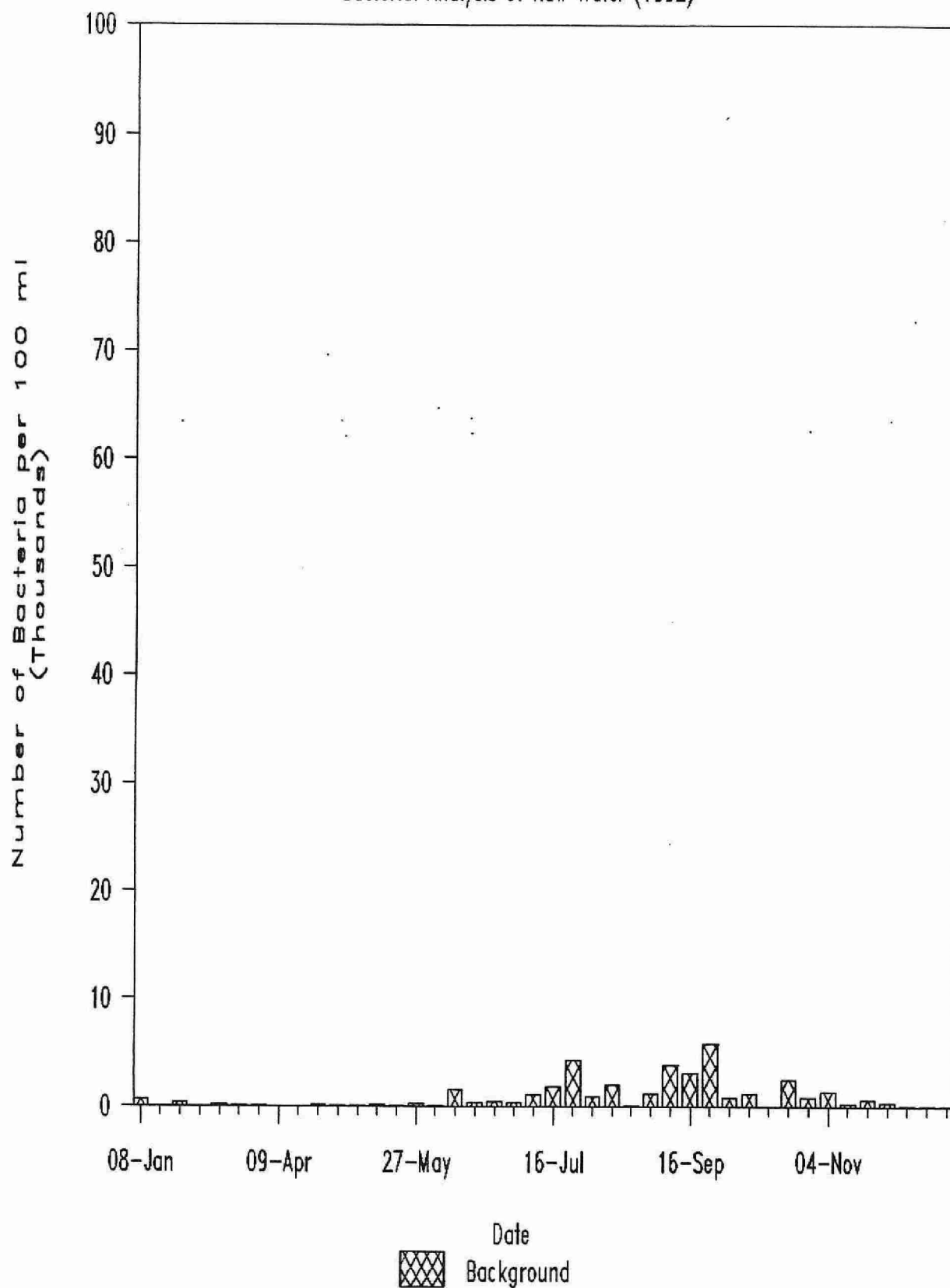
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Bacterial Analysis of Raw Water (1992)



BATH

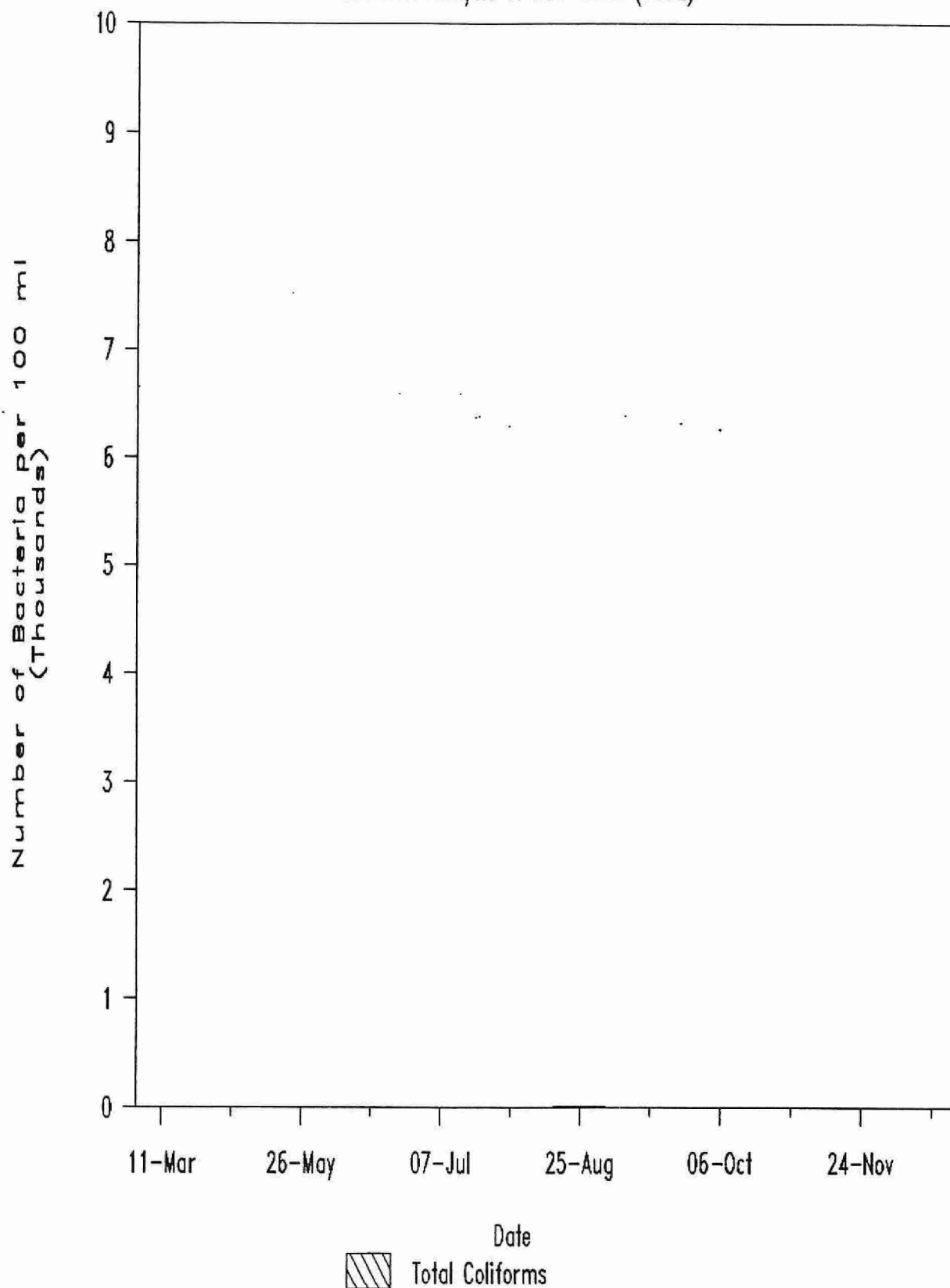
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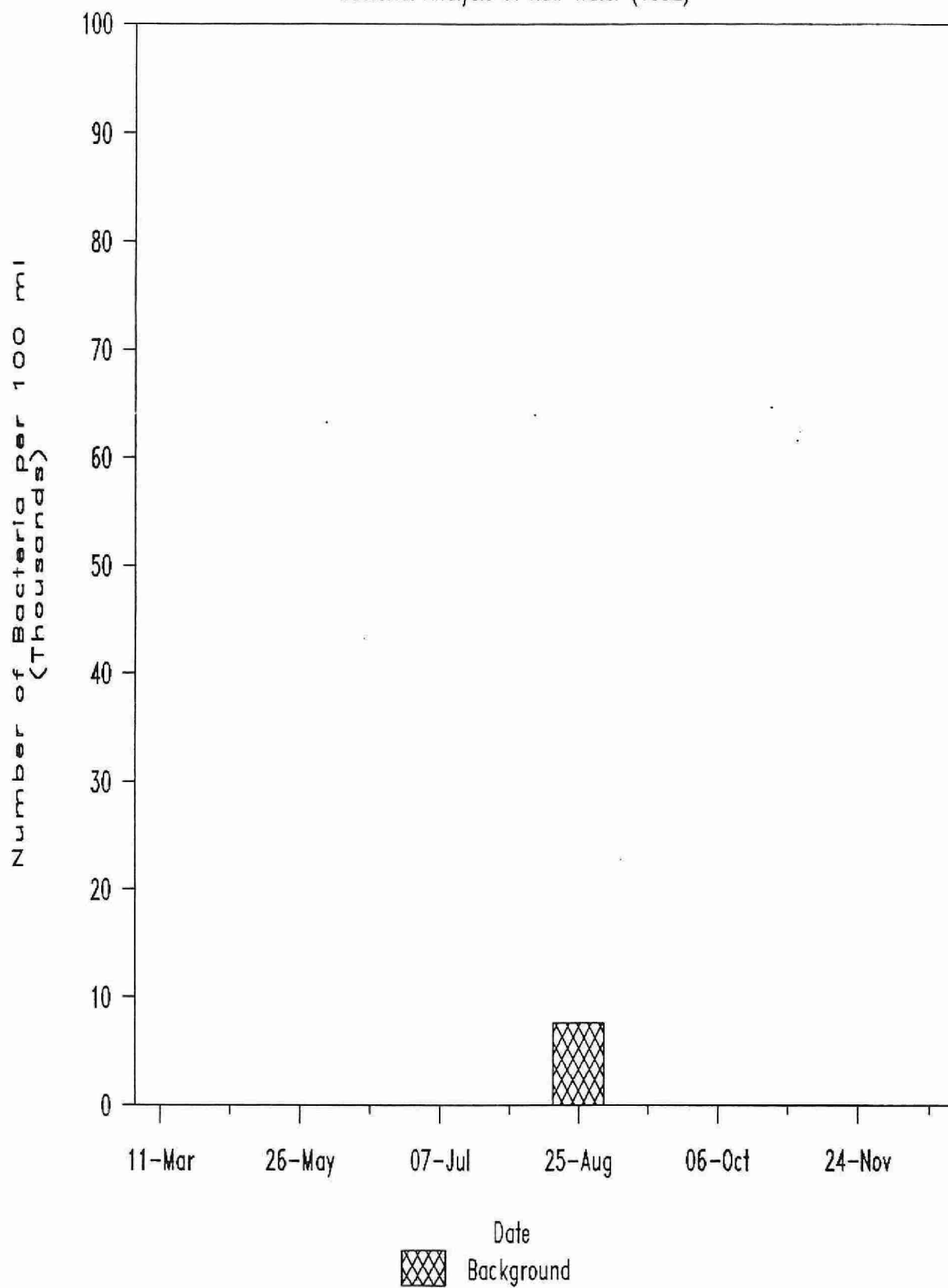
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Bacterial Analysis of Raw Water (1992)



BEACHBURG

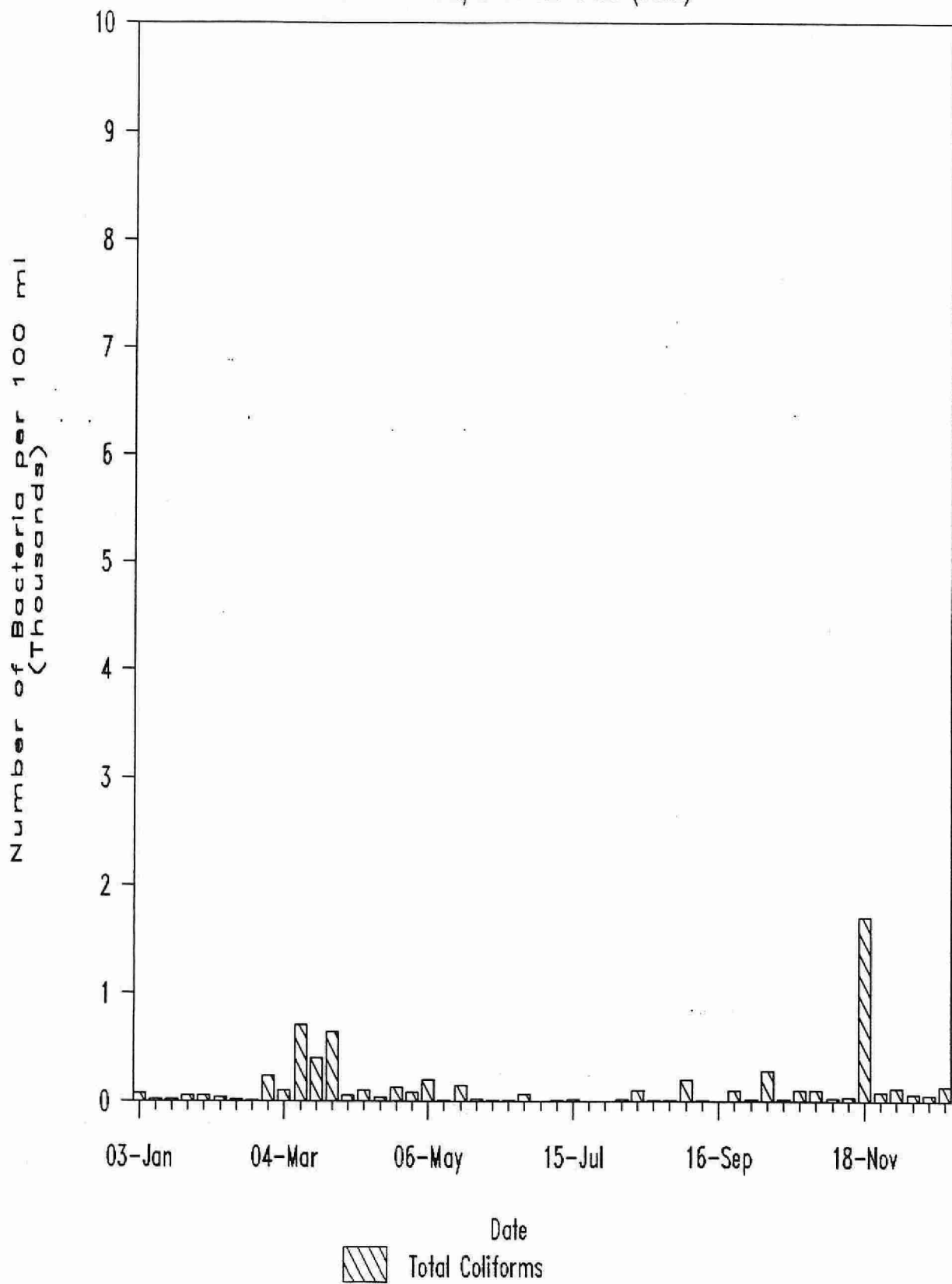
Bacterial Analysis of Raw Water (1992)



BELLEVILLE

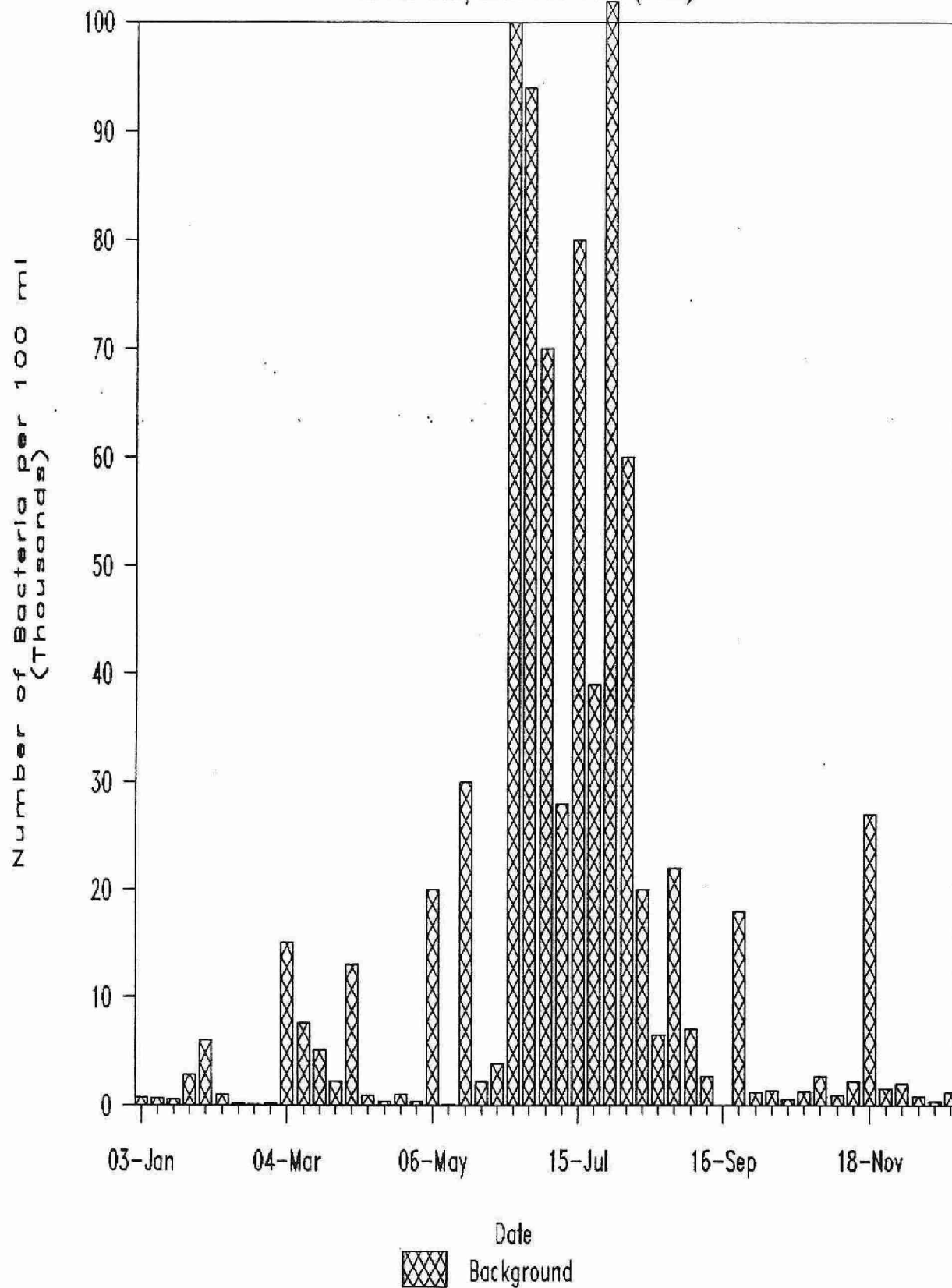
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Bacterial Analysis of Raw Water (1992)



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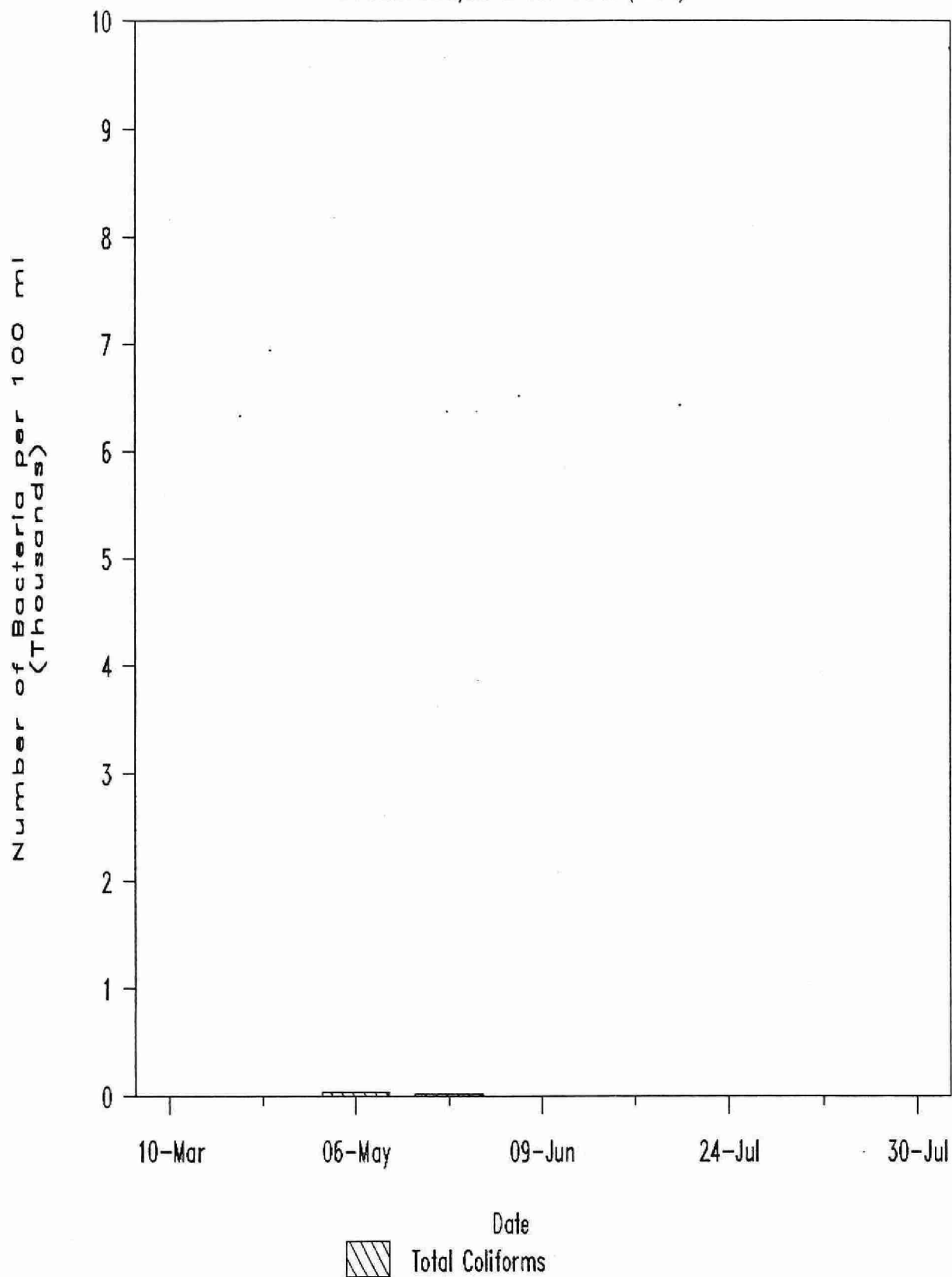
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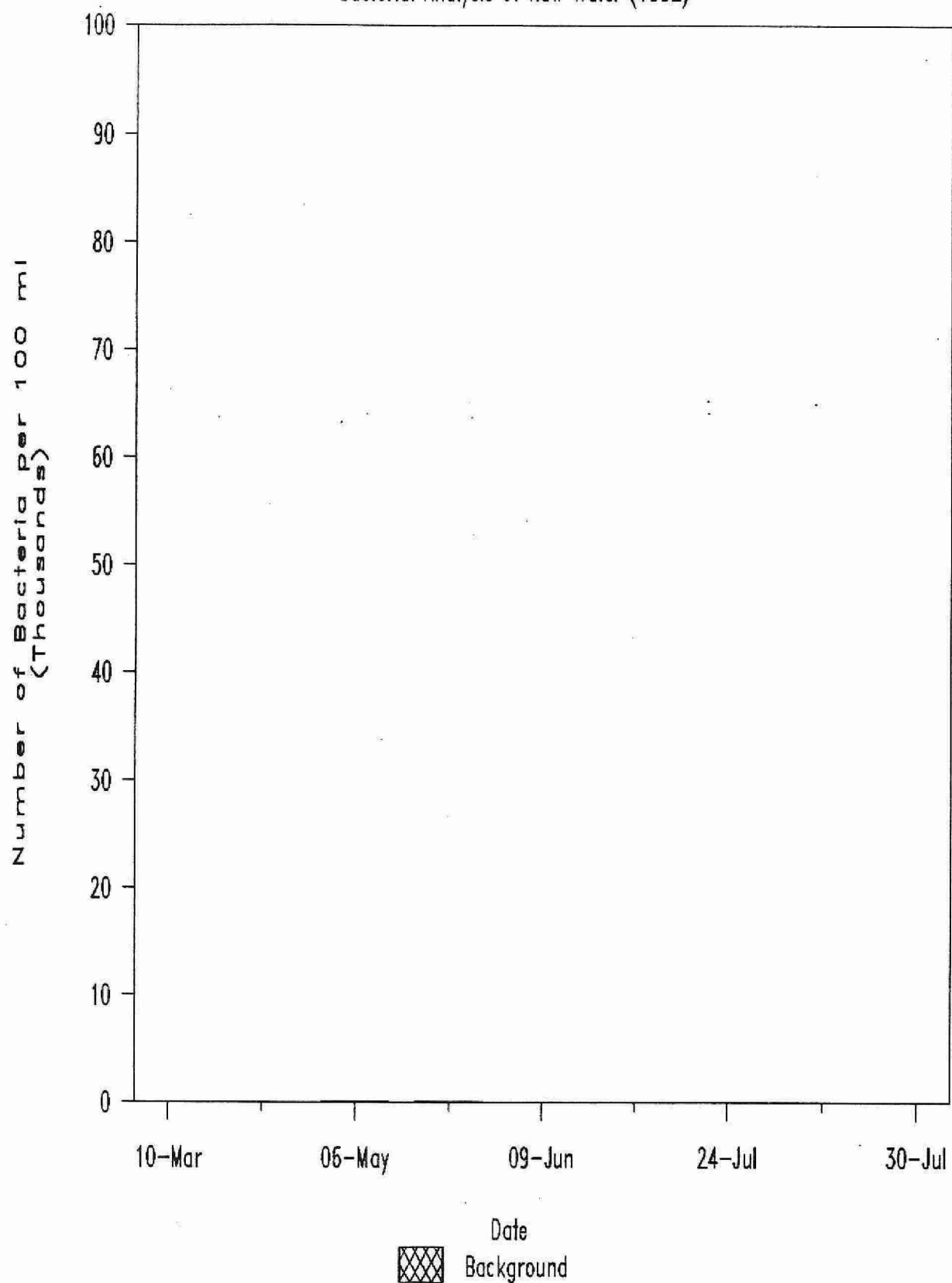
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Bacterial Analysis of Raw Water (1992)



BOURGET

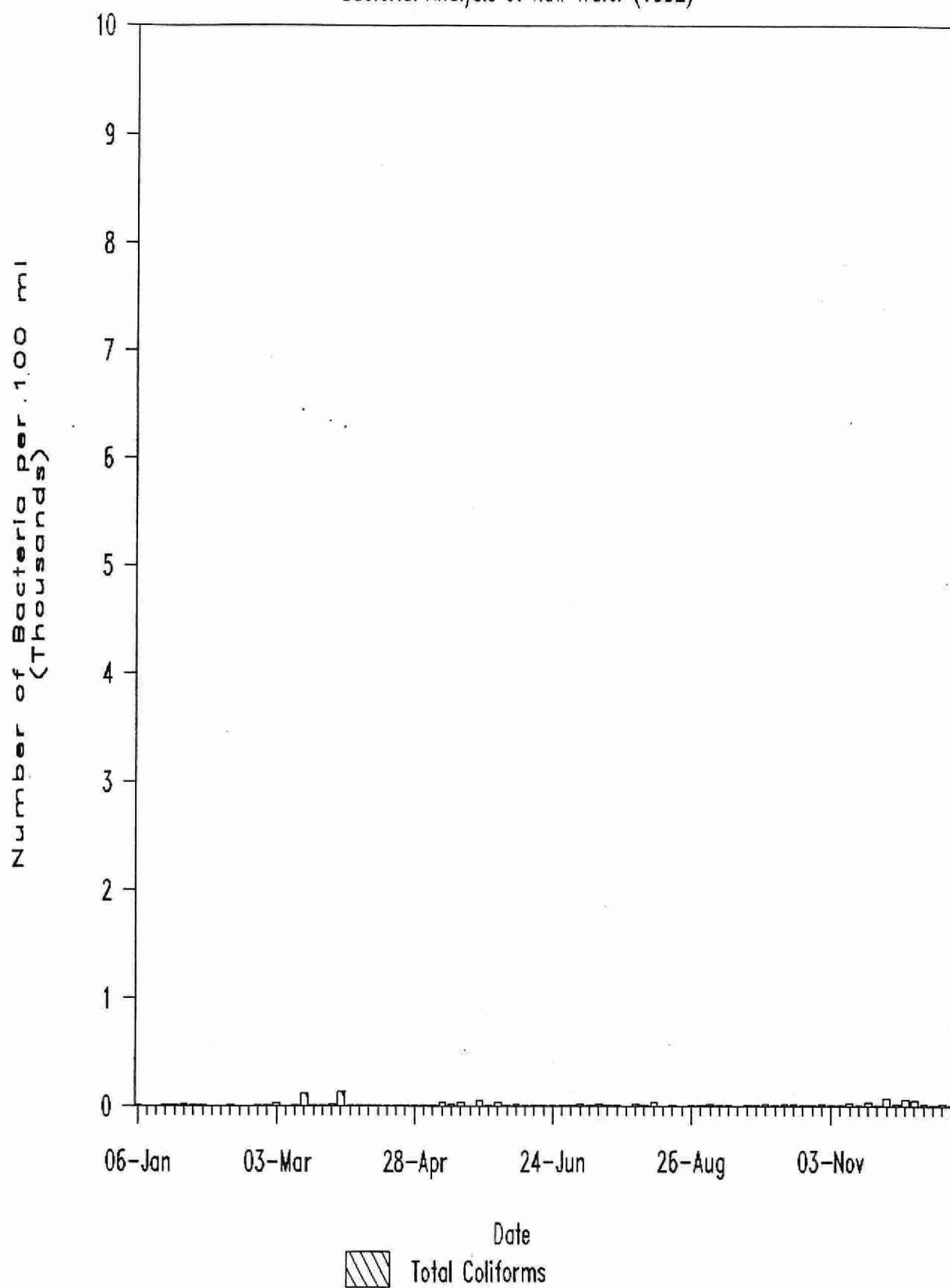
Bacterial Analysis of Raw Water (1992)



BROCKVILLE

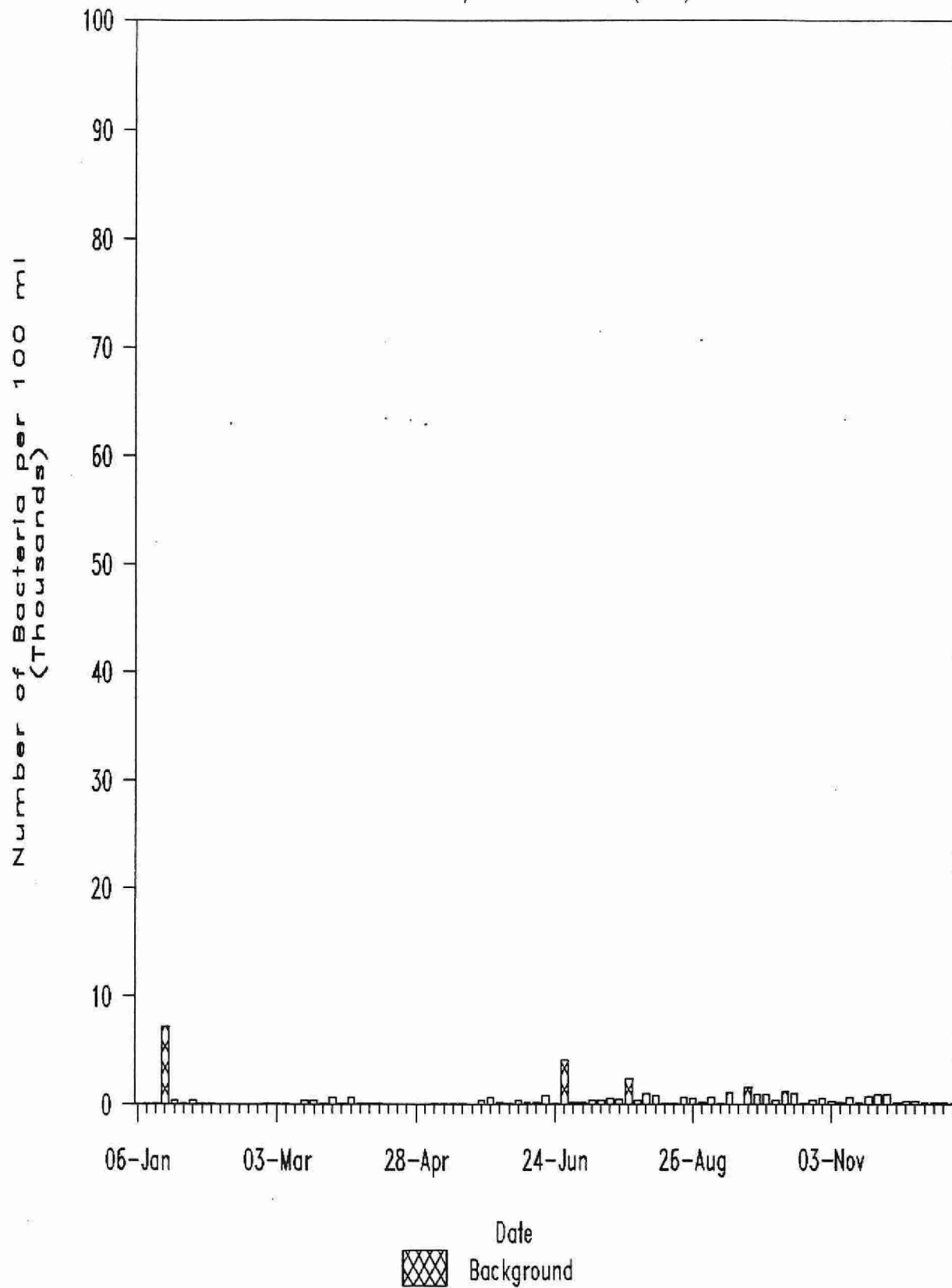
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Bacterial Analysis of Raw Water (1992)



BROCKVILLE

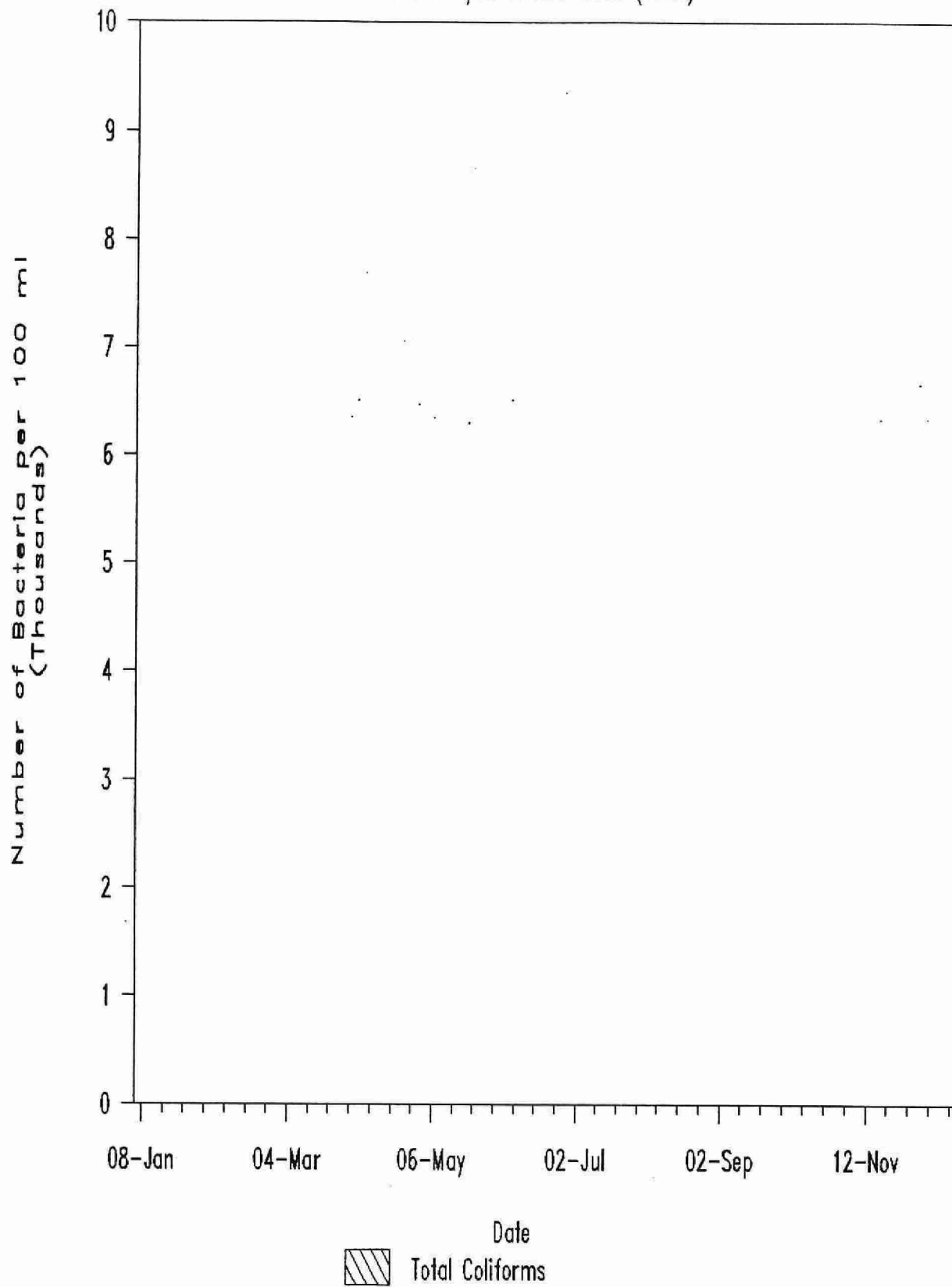
Bacterial Analysis of Raw Water (1992)



CAMBRIDGE TWP (FOREST PARK EAST)

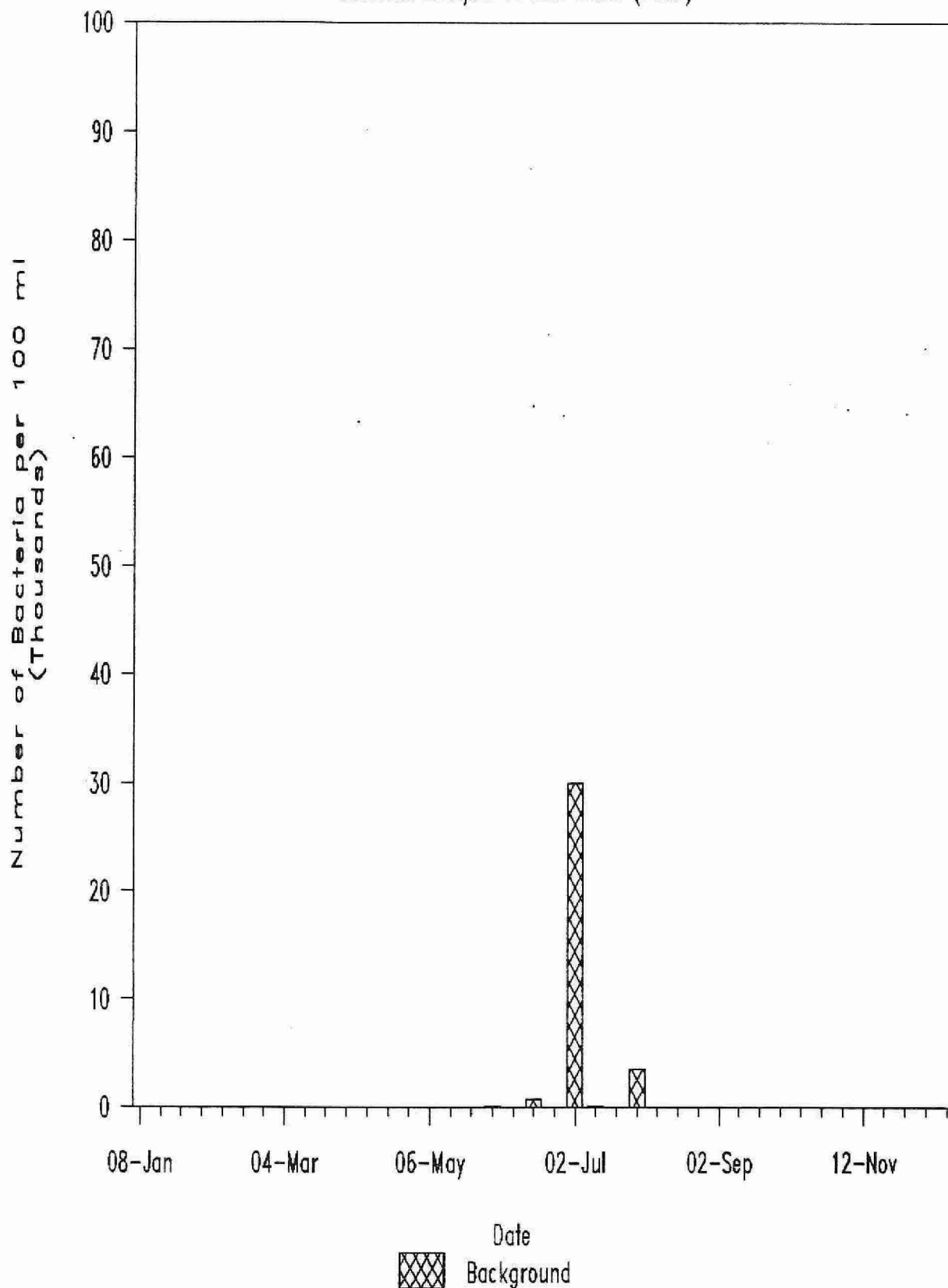
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Bacterial Analysis of Raw Water (1992)



CAMBRIDGE TWP (FOREST PARK EAST)

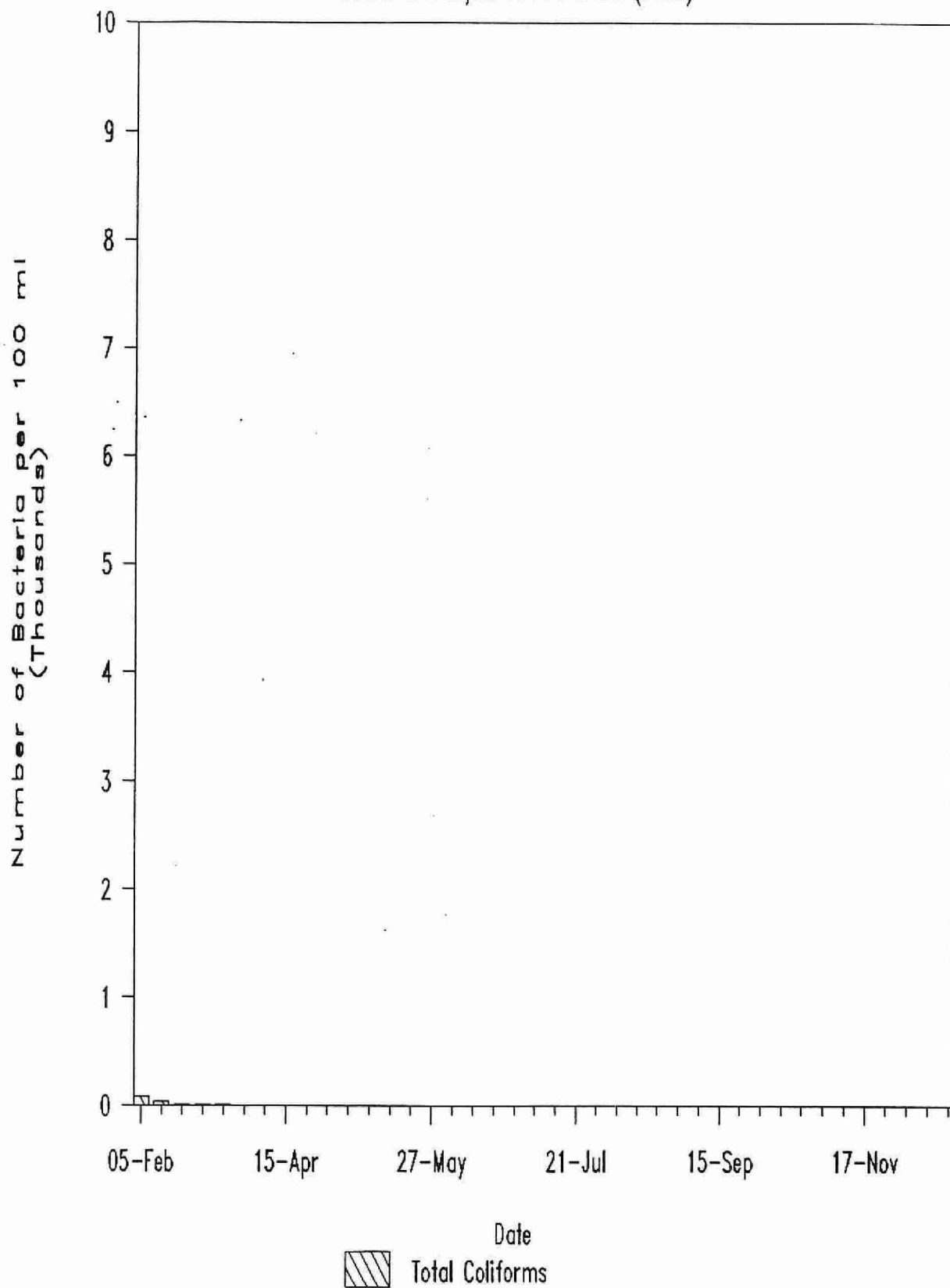
Bacterial Analysis of Raw Water (1992)



CARDINAL

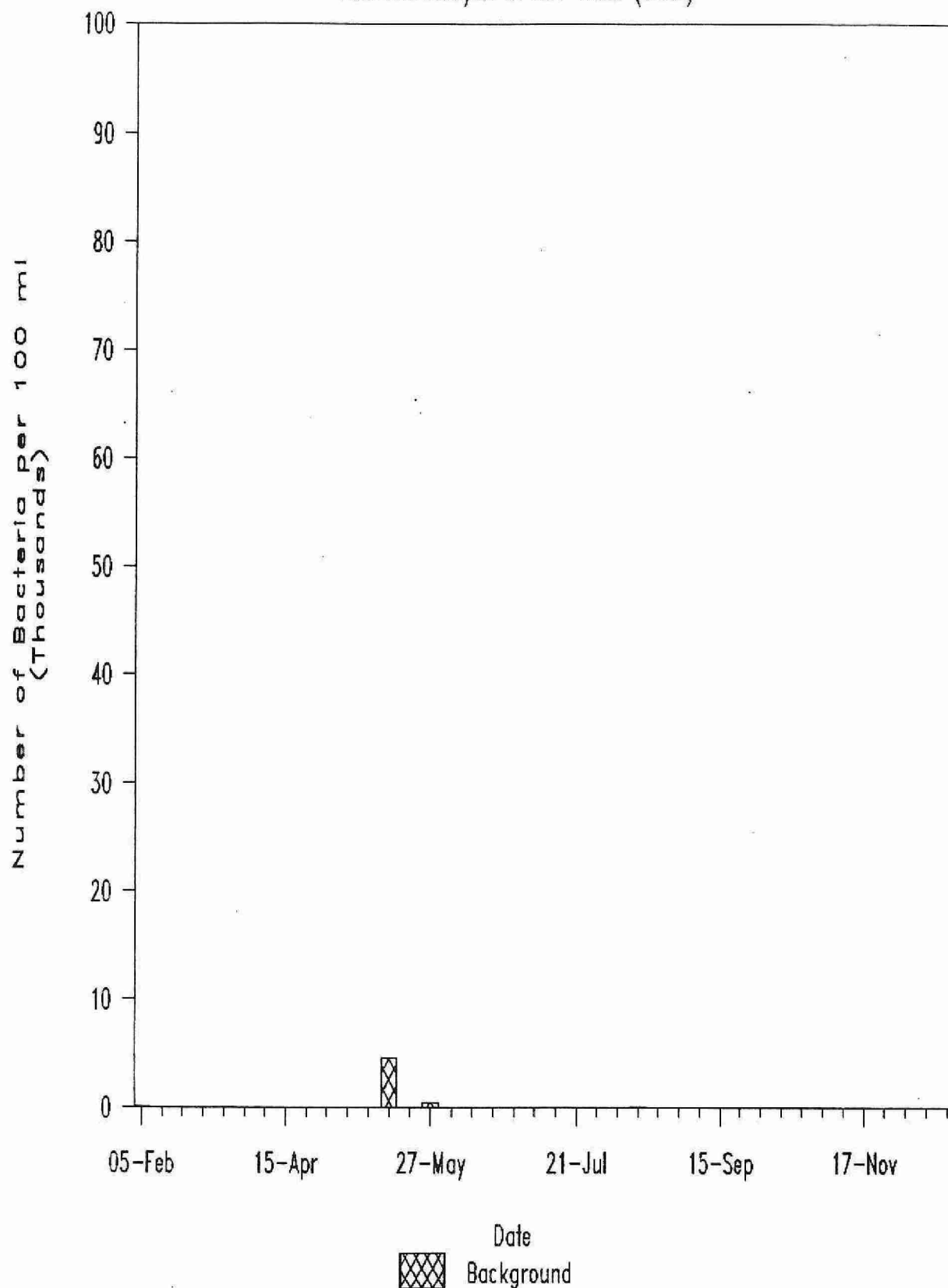
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Bacterial Analysis of Raw Water (1992)



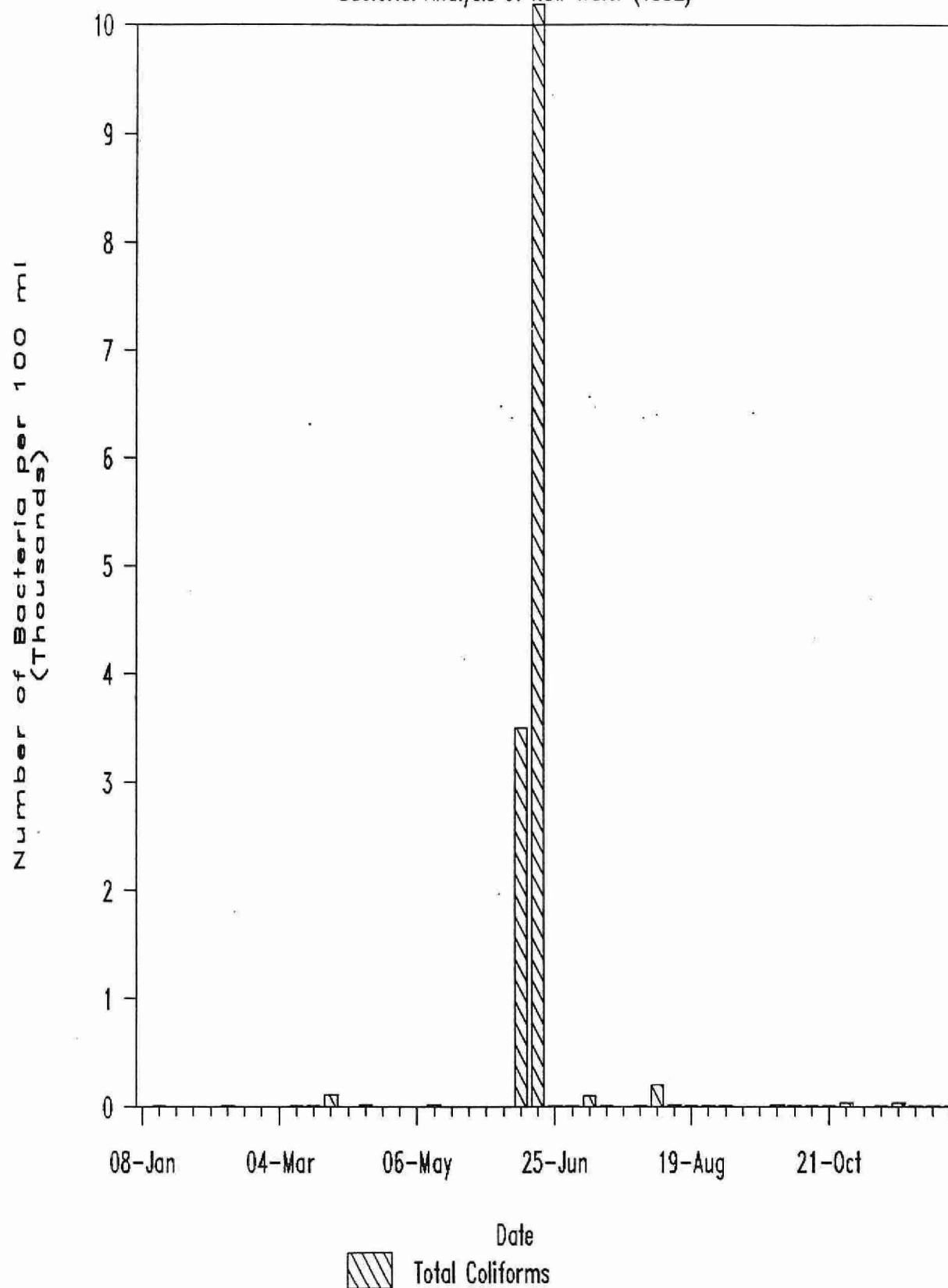
CARDINAL (TOWN)

Bacterial Analysis of Raw Water (1992)



CARLETON PLACE

Bacterial Analysis of Raw Water (1992)



Number of Bacteria per 100 ml (Thousands)

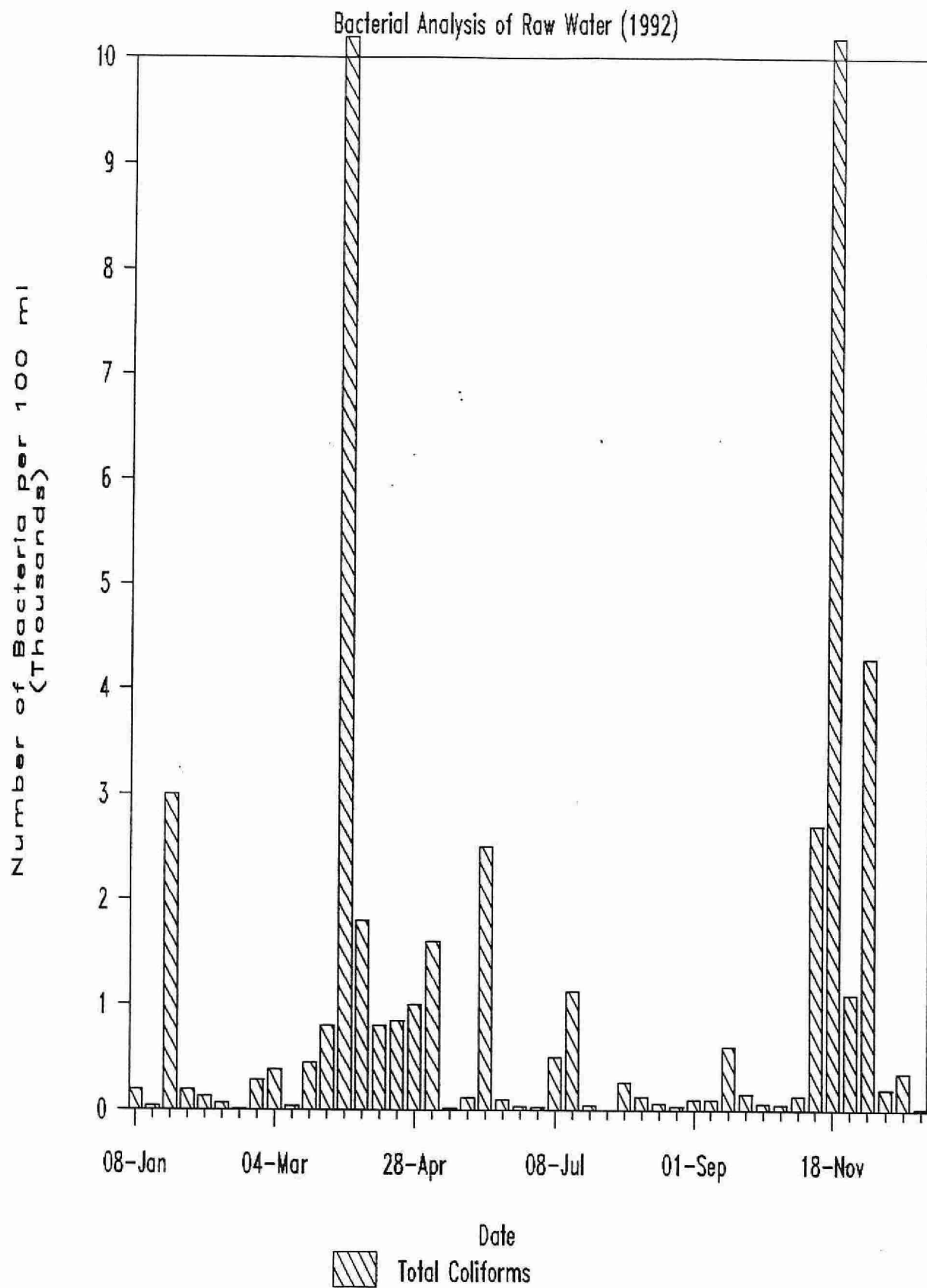
Date

Background

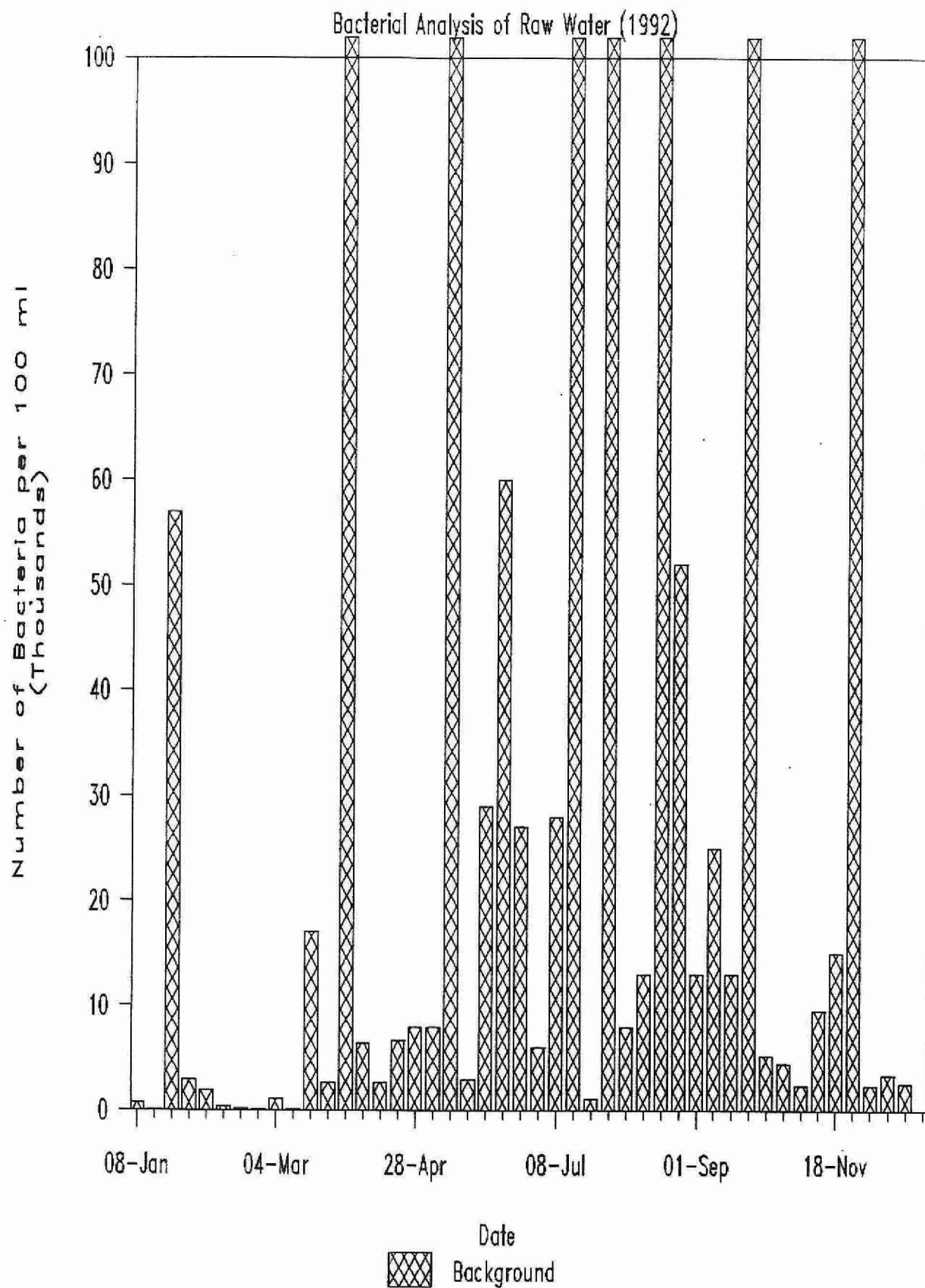
Date	Number of Bacteria per 100 ml (Thousands)
08-Jan	0.5
15-Jan	0.5
22-Jan	0.5
29-Jan	0.5
05-Feb	0.5
12-Feb	0.5
19-Feb	0.5
26-Feb	0.5
05-Mar	0.5
12-Mar	0.5
19-Mar	0.5
26-Mar	0.5
02-Apr	0.5
09-Apr	0.5
16-Apr	0.5
23-Apr	0.5
30-Apr	0.5
07-May	0.5
14-May	0.5
21-May	0.5
28-May	0.5
04-Jun	0.5
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25-Jun	0.5
02-Jul	0.5
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23-Jul	0.5
30-Jul	0.5
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13-Aug	0.5
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01-Oct	0.5
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24-Dec	0.5
31-Dec	0.5

CASSELMAN

35



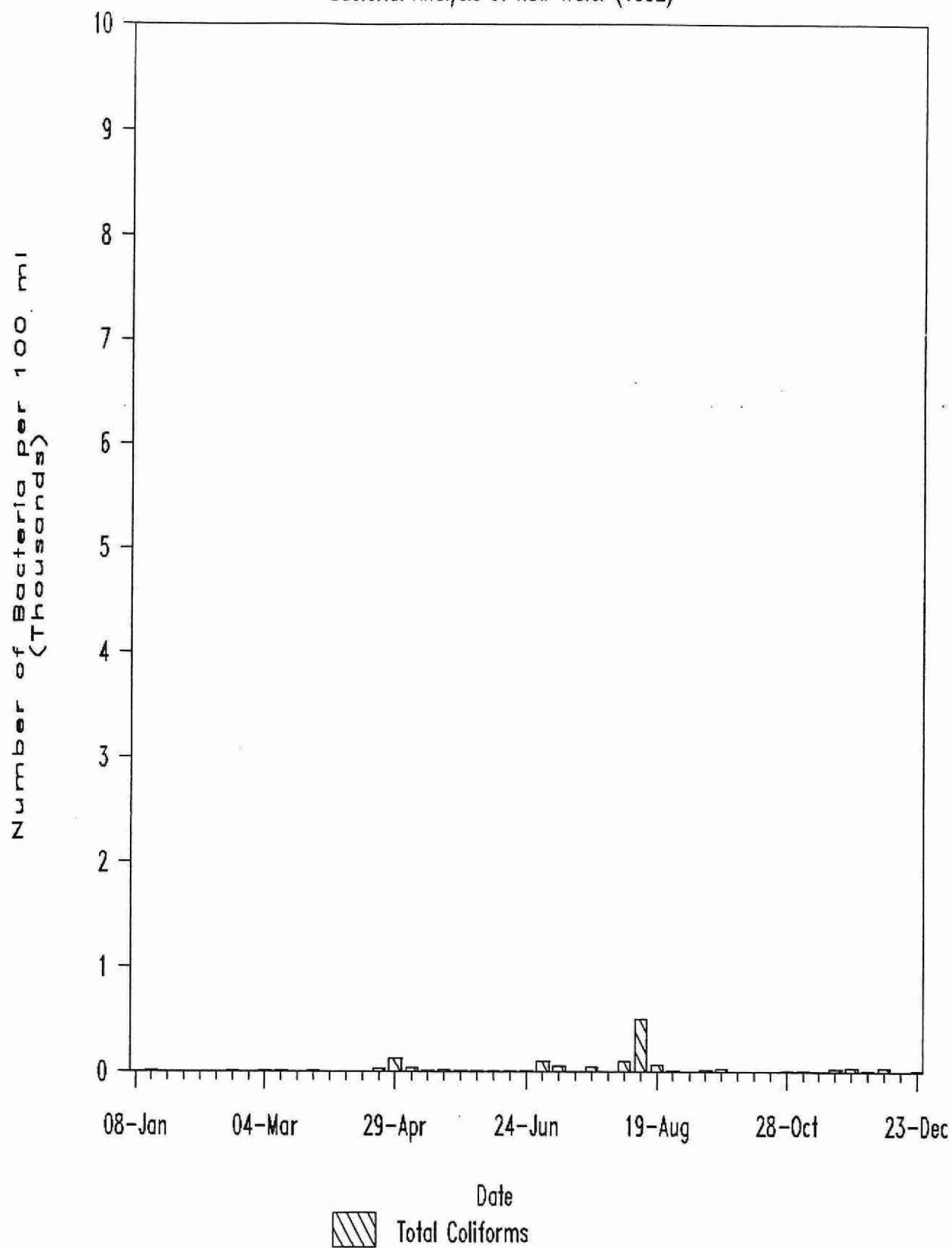
CASSELMAN



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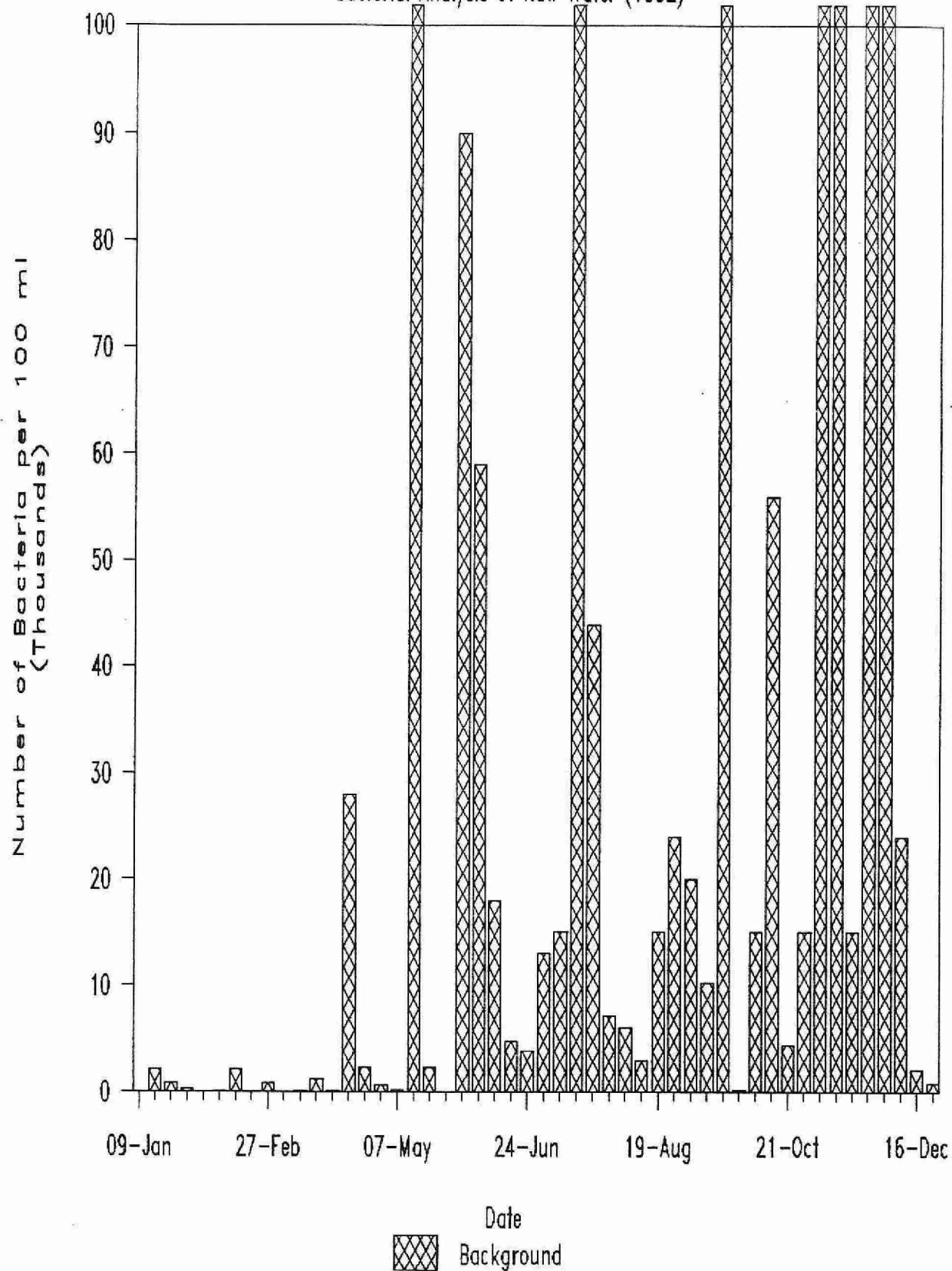
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Bacterial Analysis of Raw Water (1992)



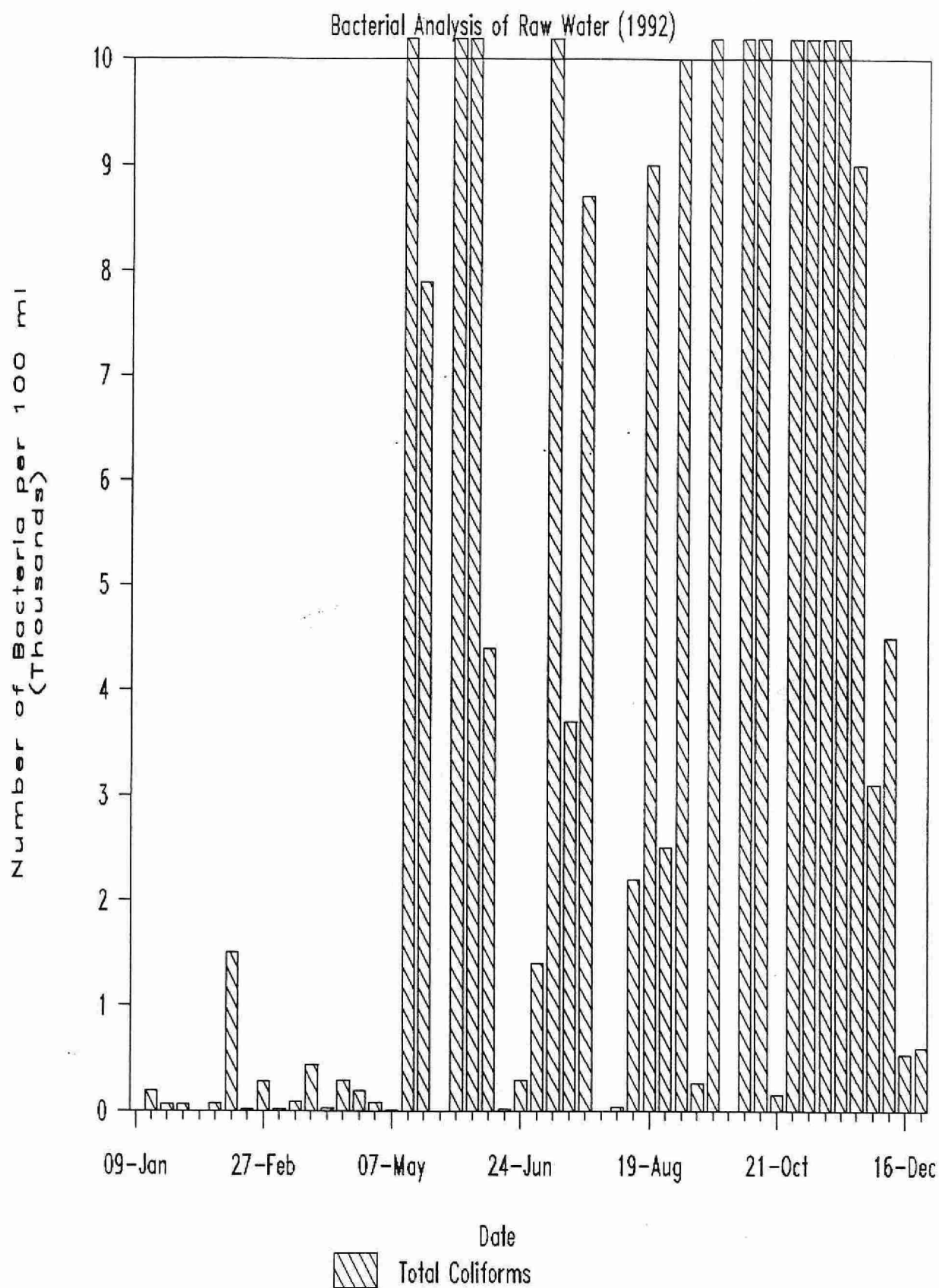
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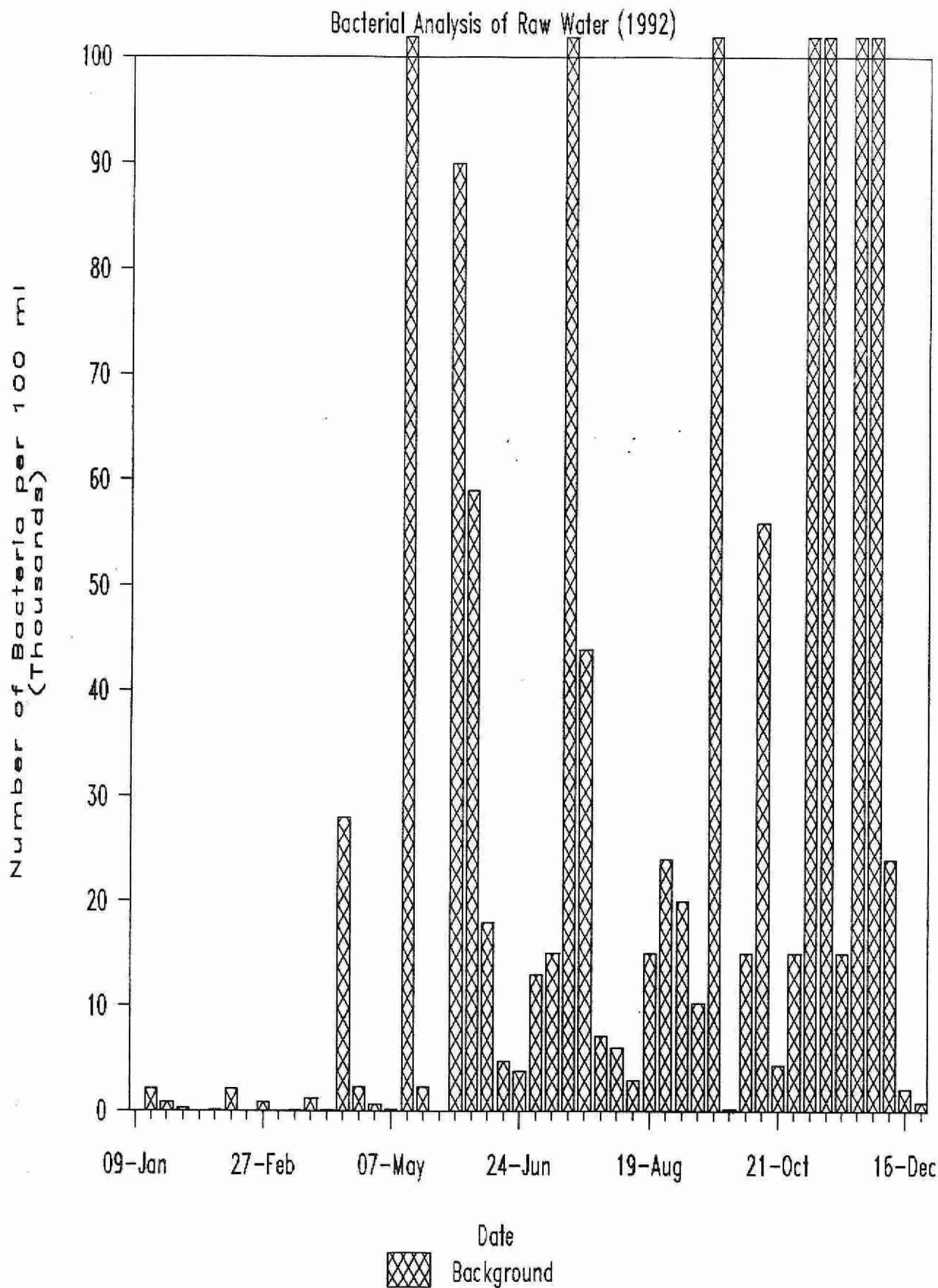
Bacterial Analysis of Raw Water (1992)



CHARLOTTENBURGH (PURCELL)

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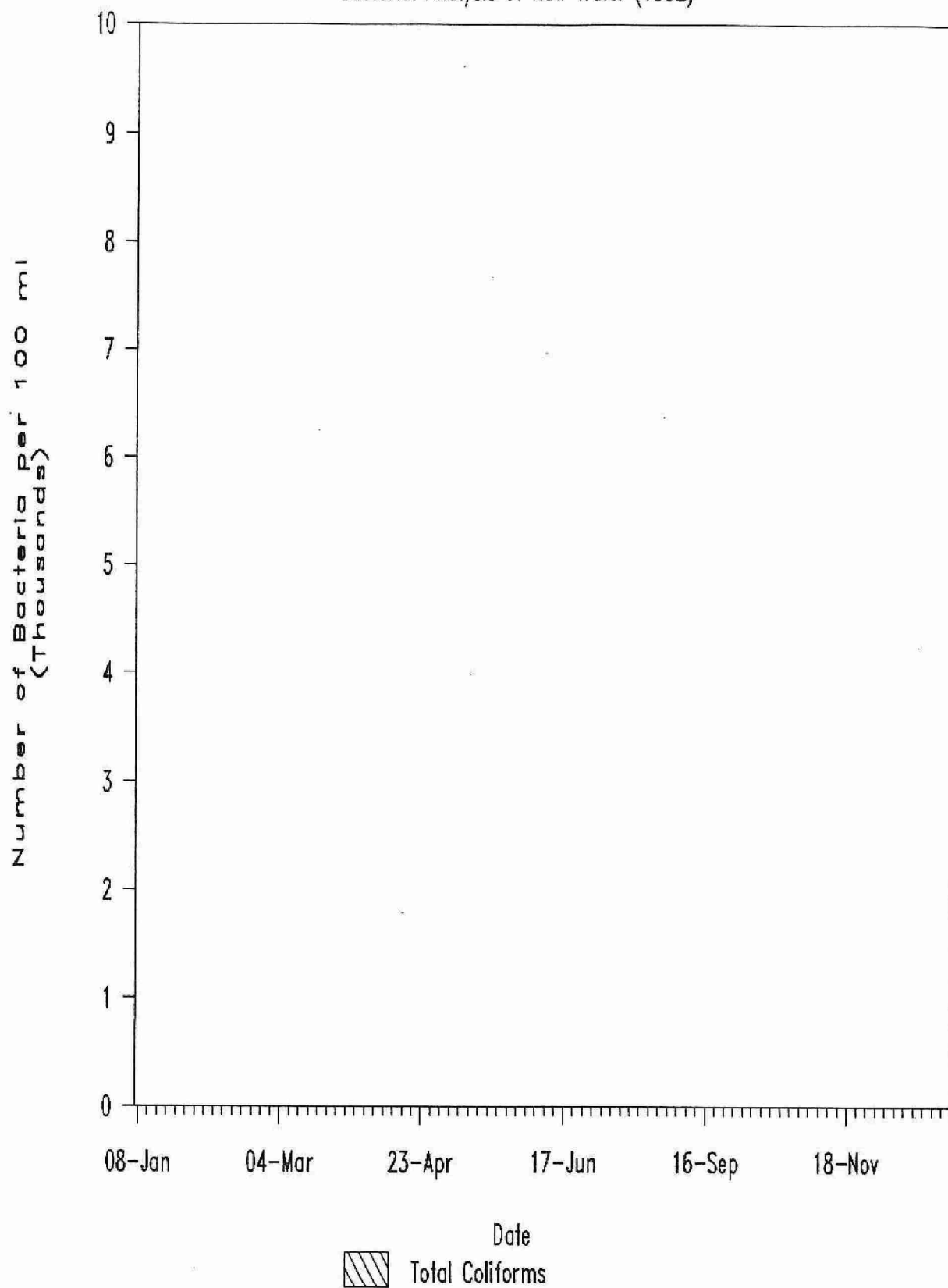




CHESTERVILLE

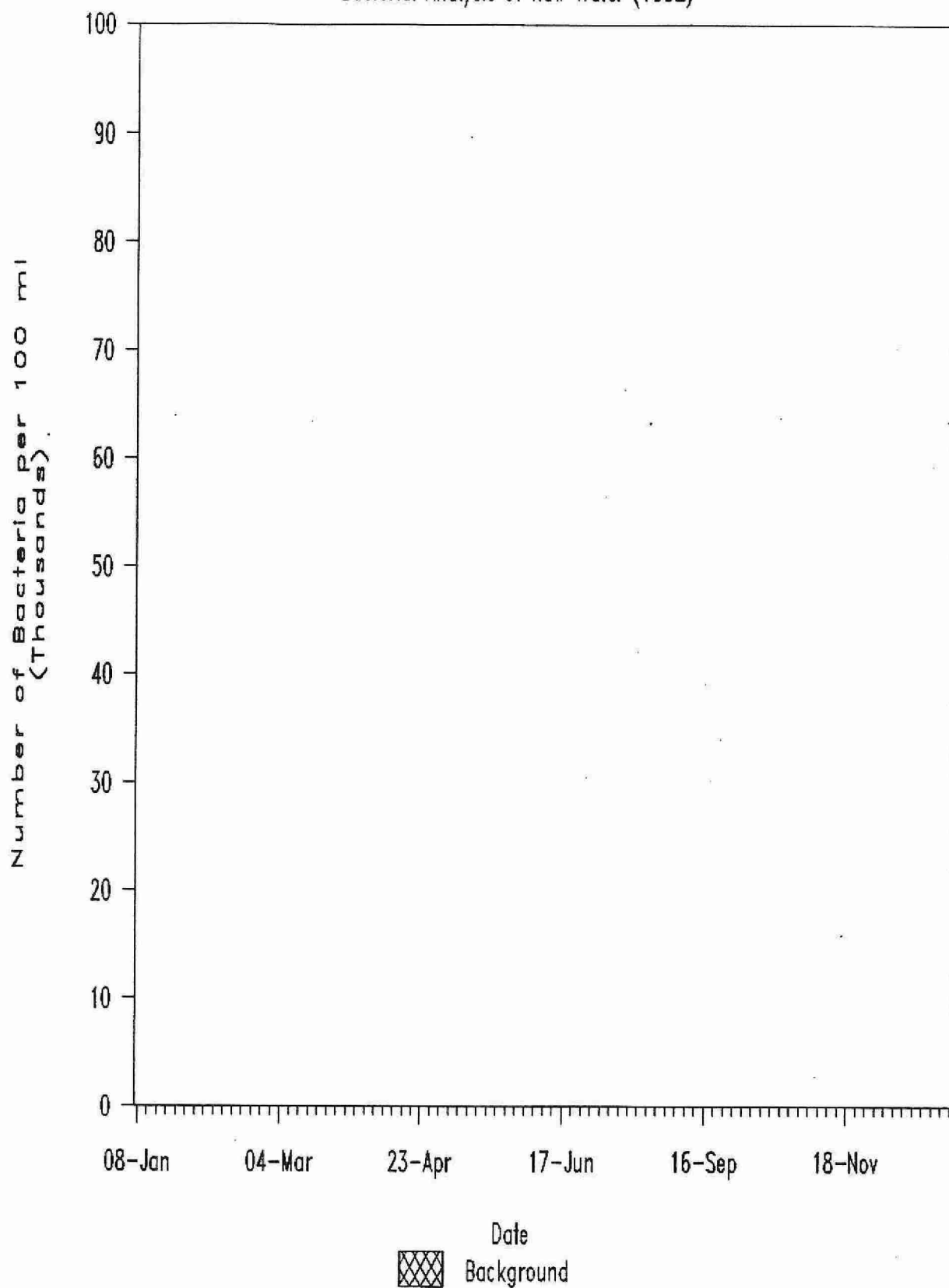
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Bacterial Analysis of Raw Water (1992)



CHESTERVILLE

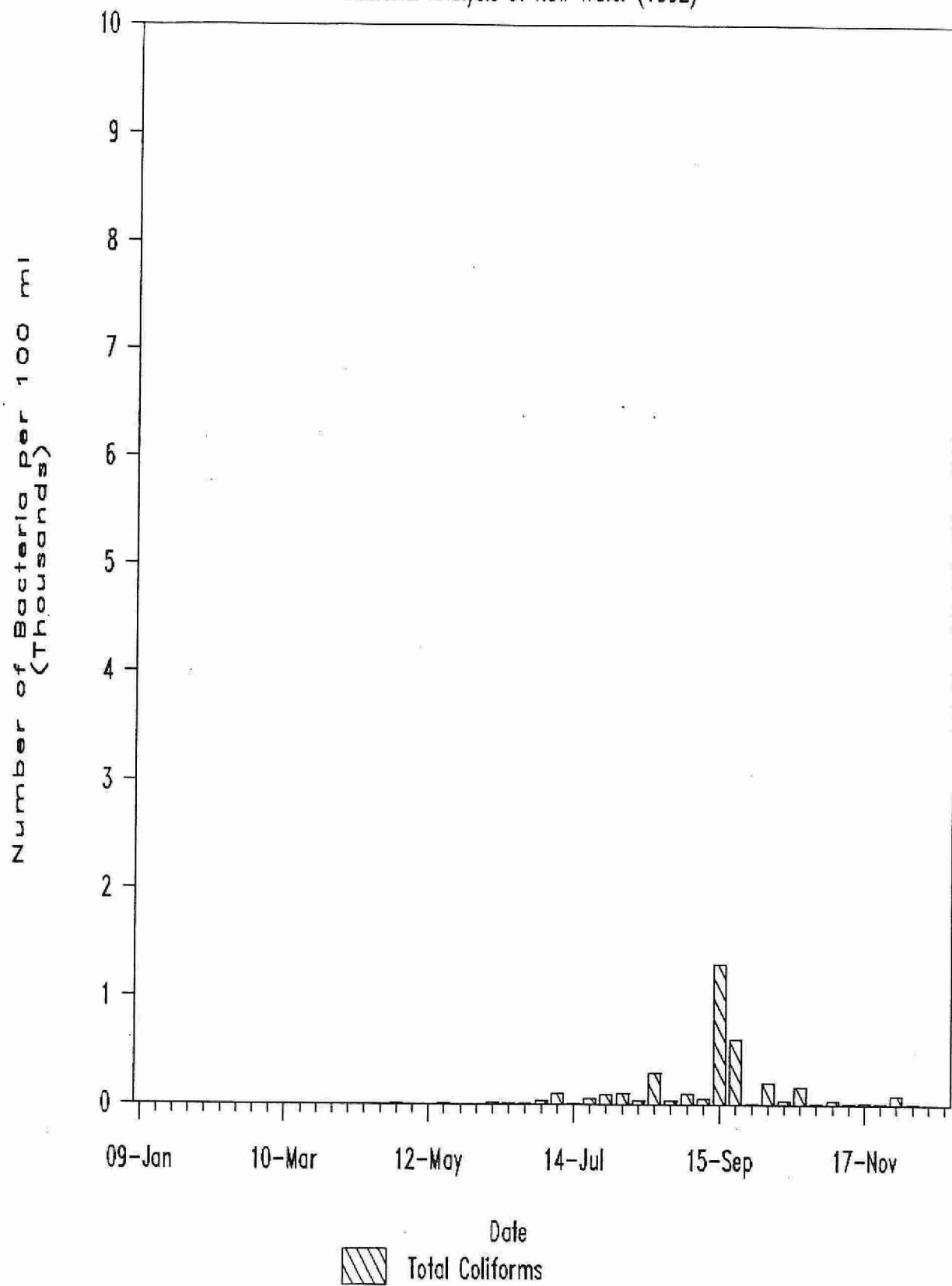
Bacterial Analysis of Raw Water (1992)



CLARENCE TWP (CHENEY)

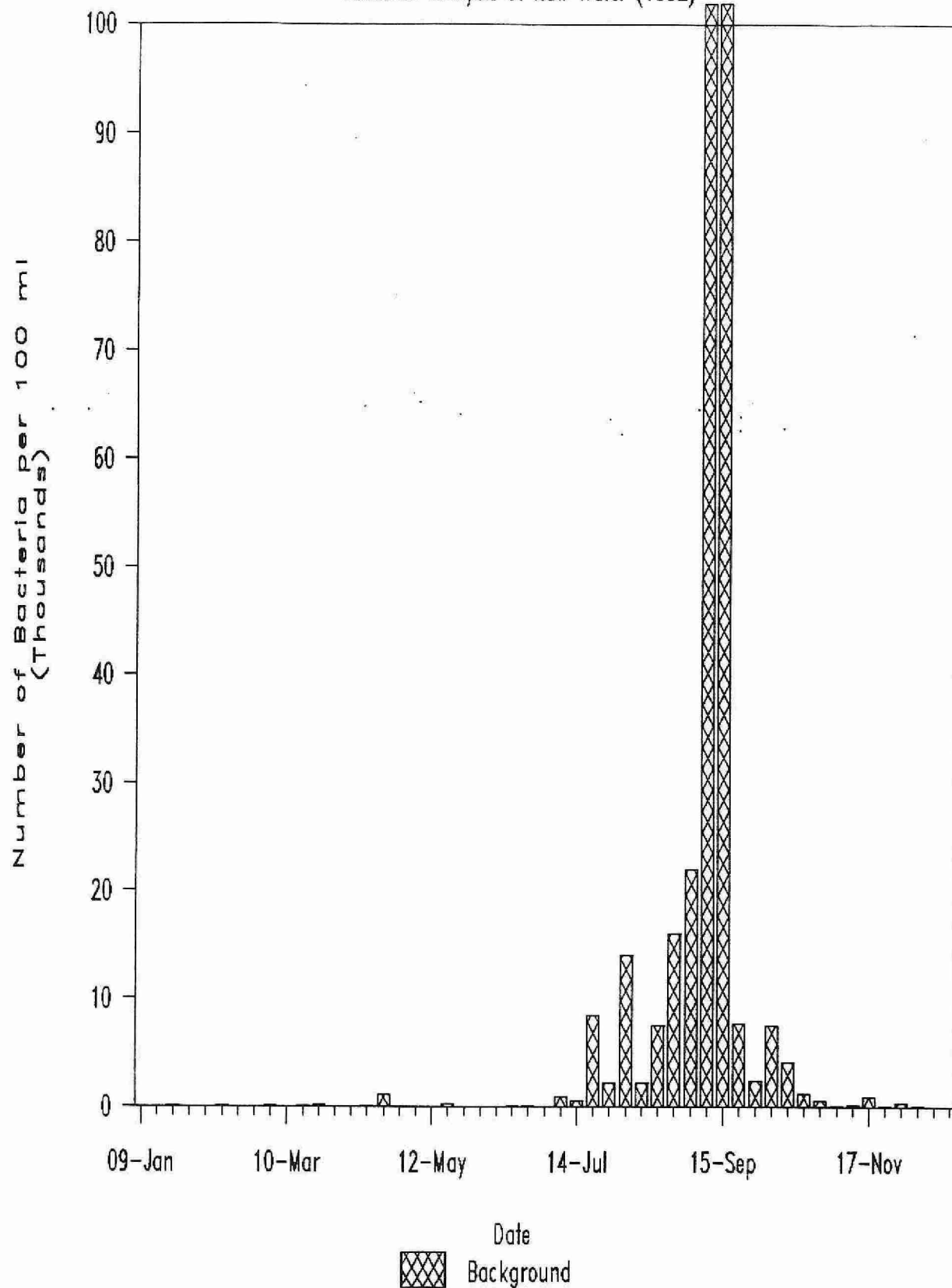
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Bacterial Analysis of Raw Water (1992)



CLARENCE TWP (CHENEY)

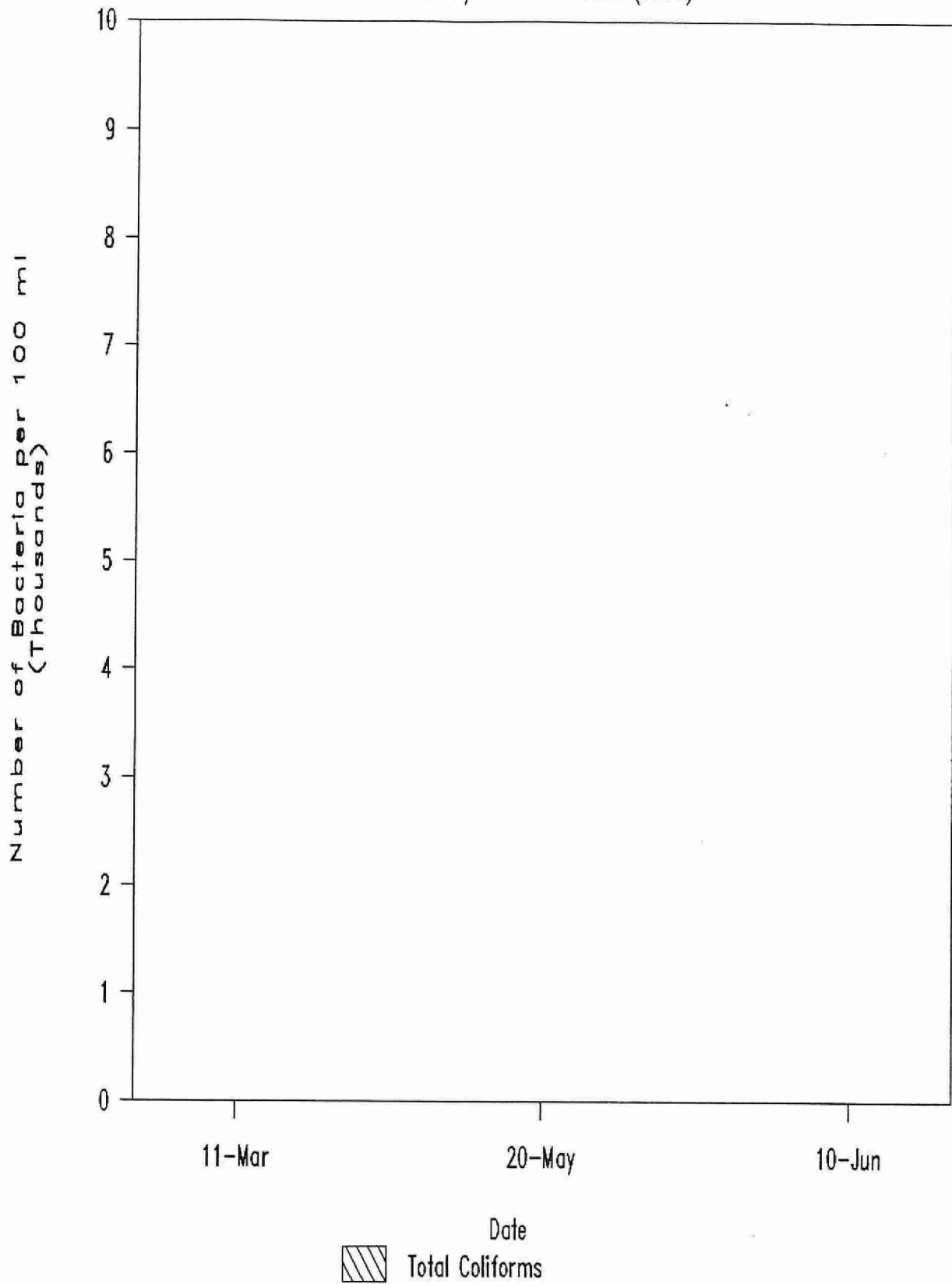
Bacterial Analysis of Raw Water (1992)



CLARENCE TWP (CLARENCE CREEK)

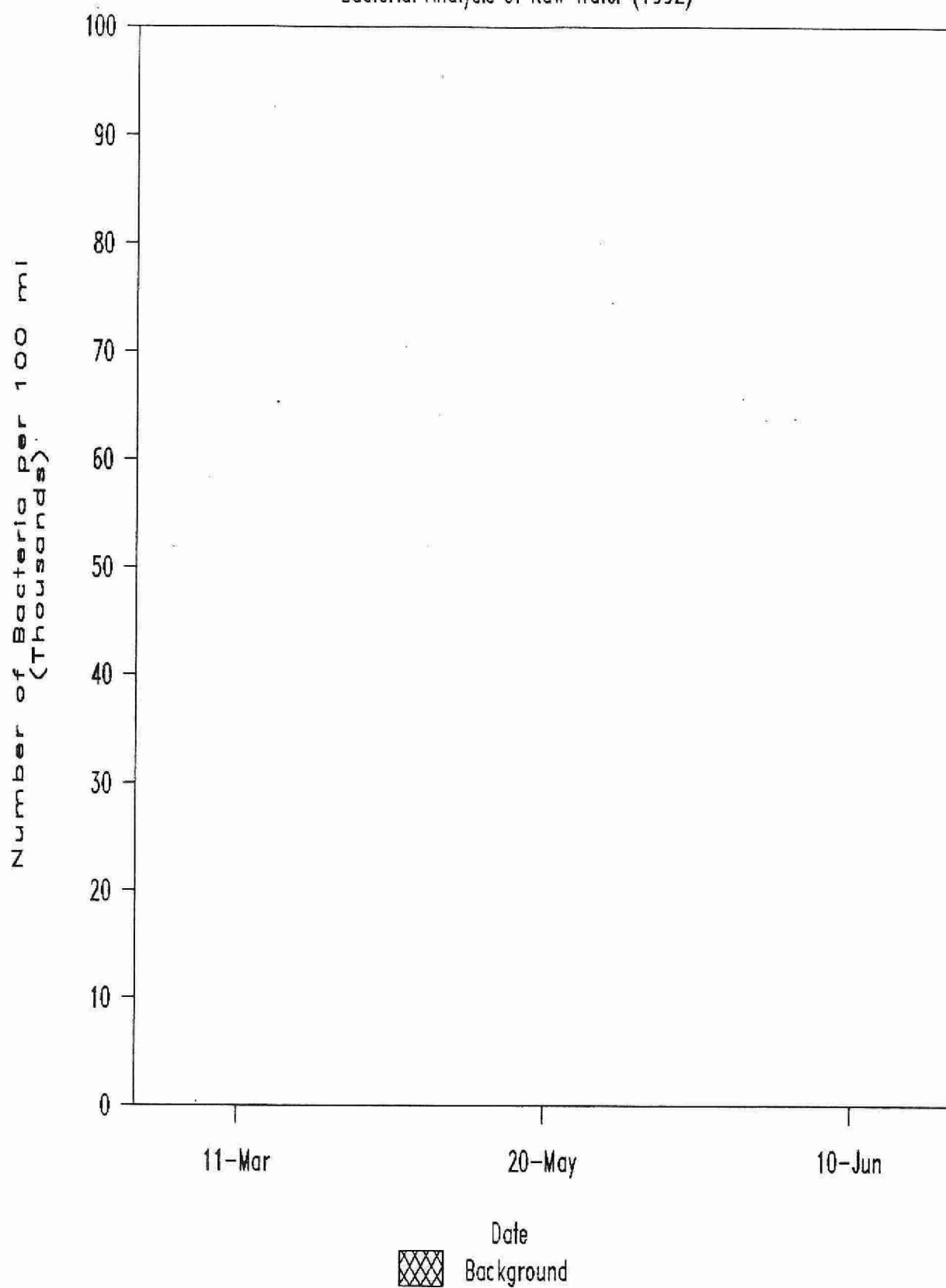
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Bacterial Analysis of Raw Water (1992)



CLARENCE TWP (CLARENCE CREEK)

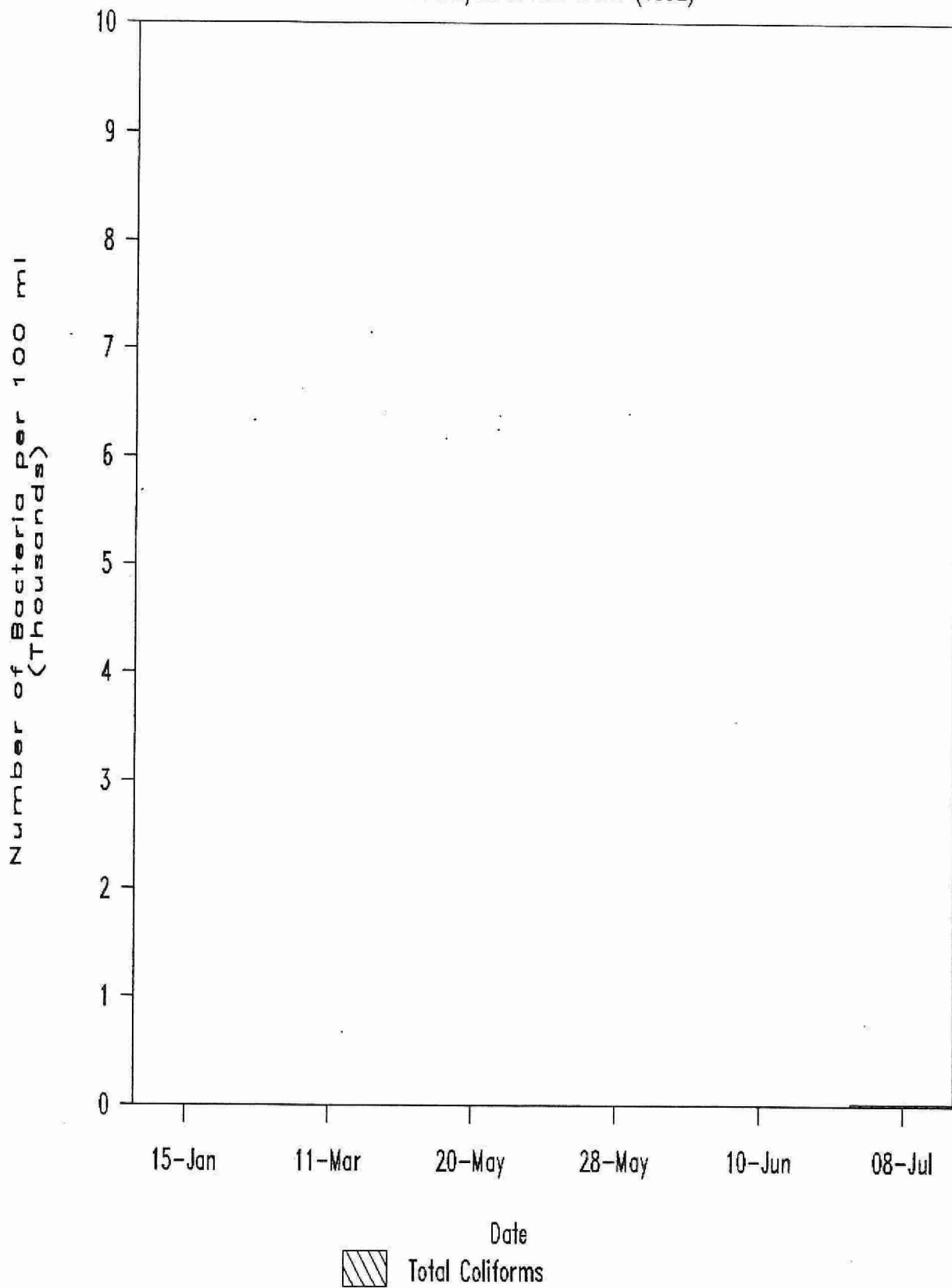
Bacterial Analysis of Raw Water (1992)



CLARENCE TWP (HAMMOND)

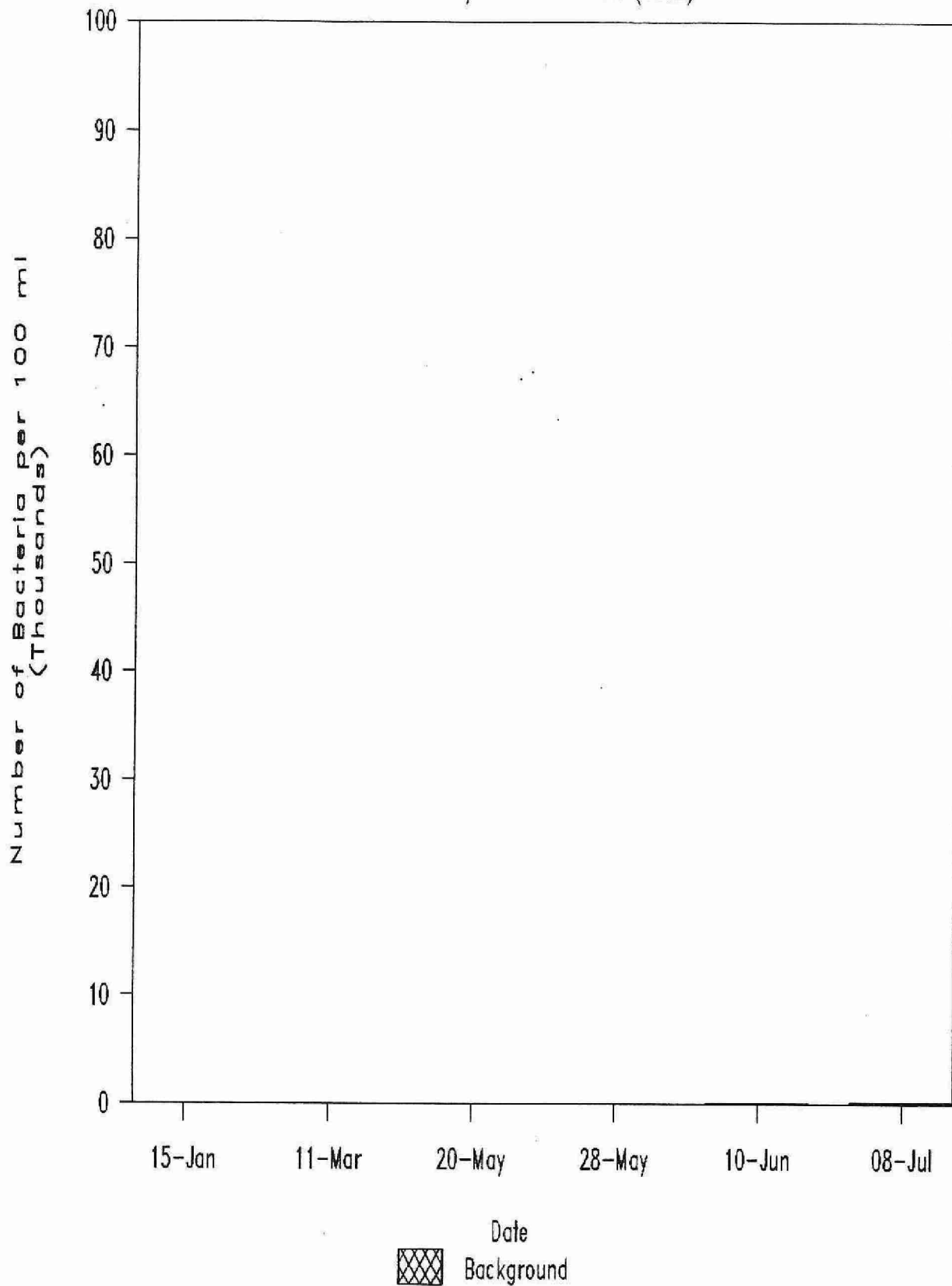
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Bacterial Analysis of Raw Water (1992)



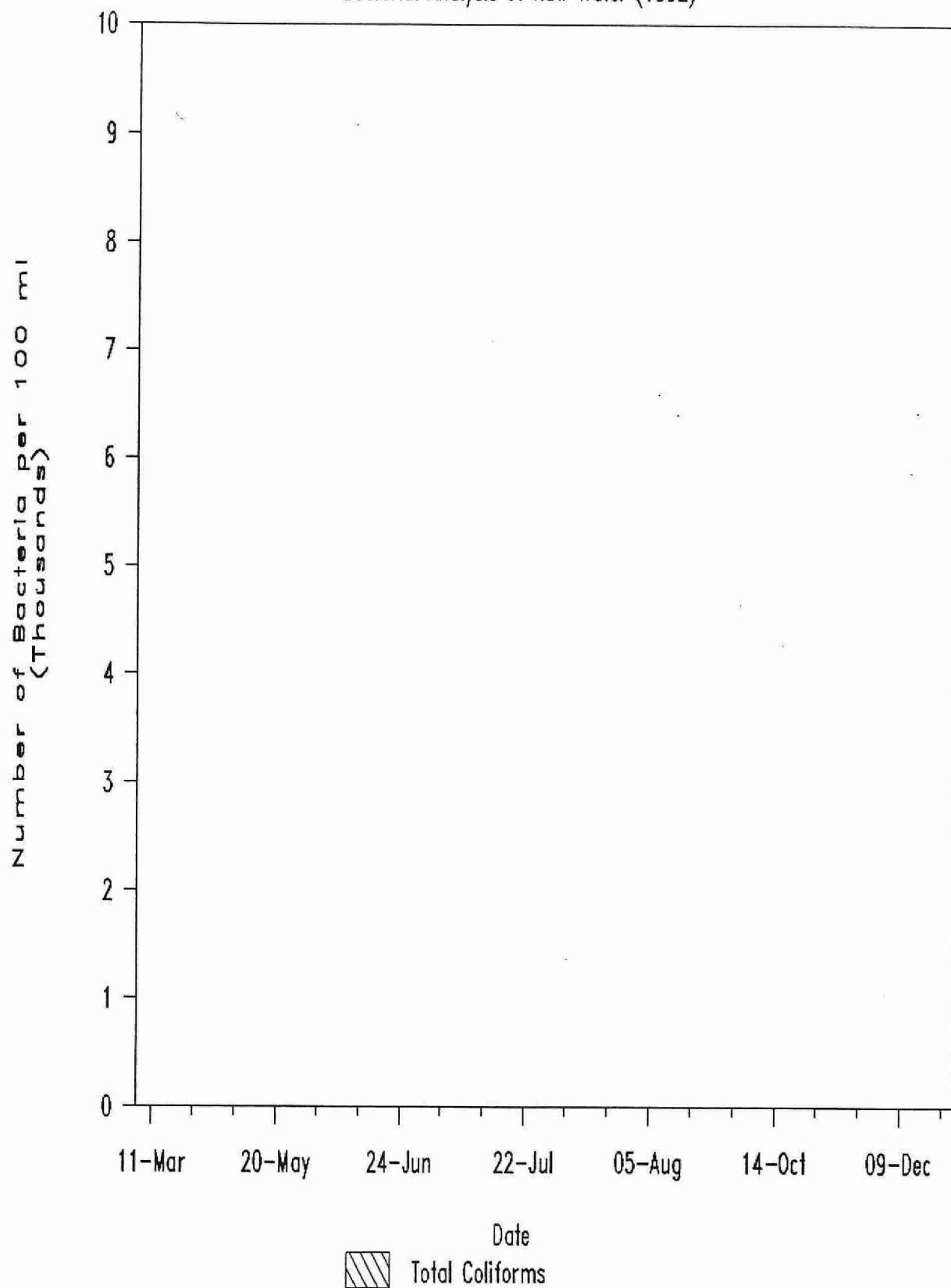
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Bacterial Analysis of Raw Water (1992)



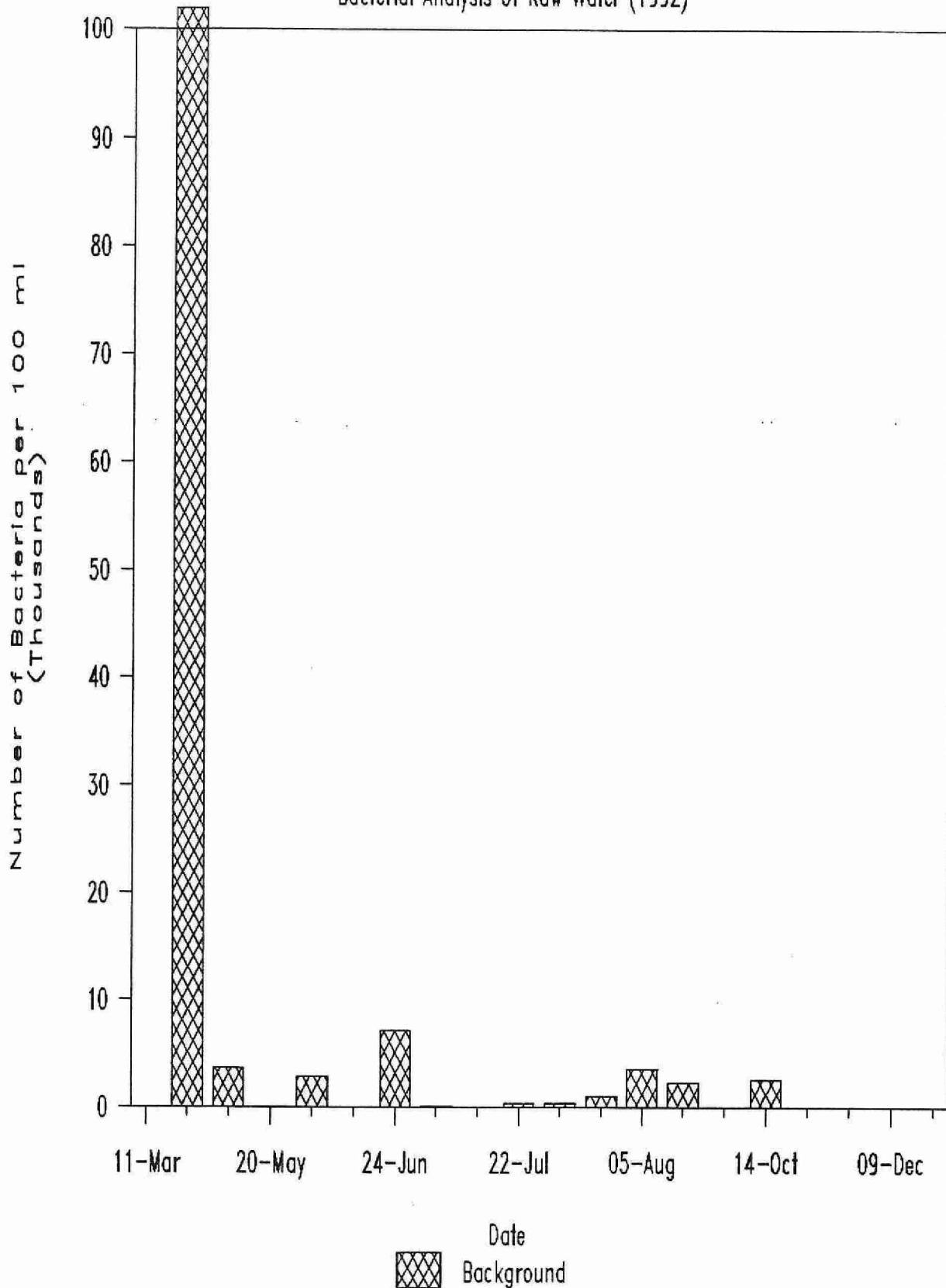
CLARENCE TWP (ST PASCAL)

Bacterial Analysis of Raw Water (1992)



CLARENCE TWP (ST. PASCAL)

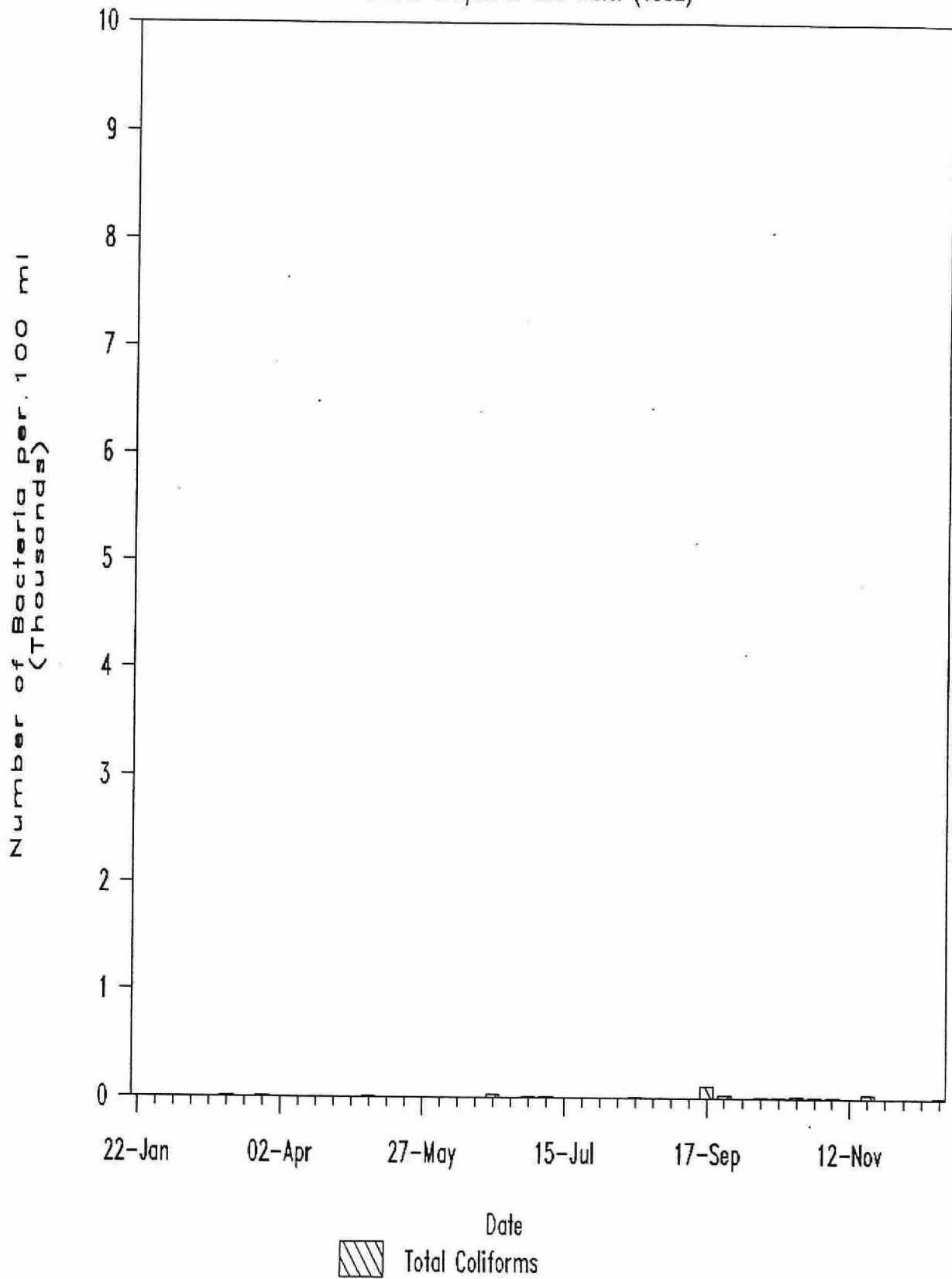
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COBDEN

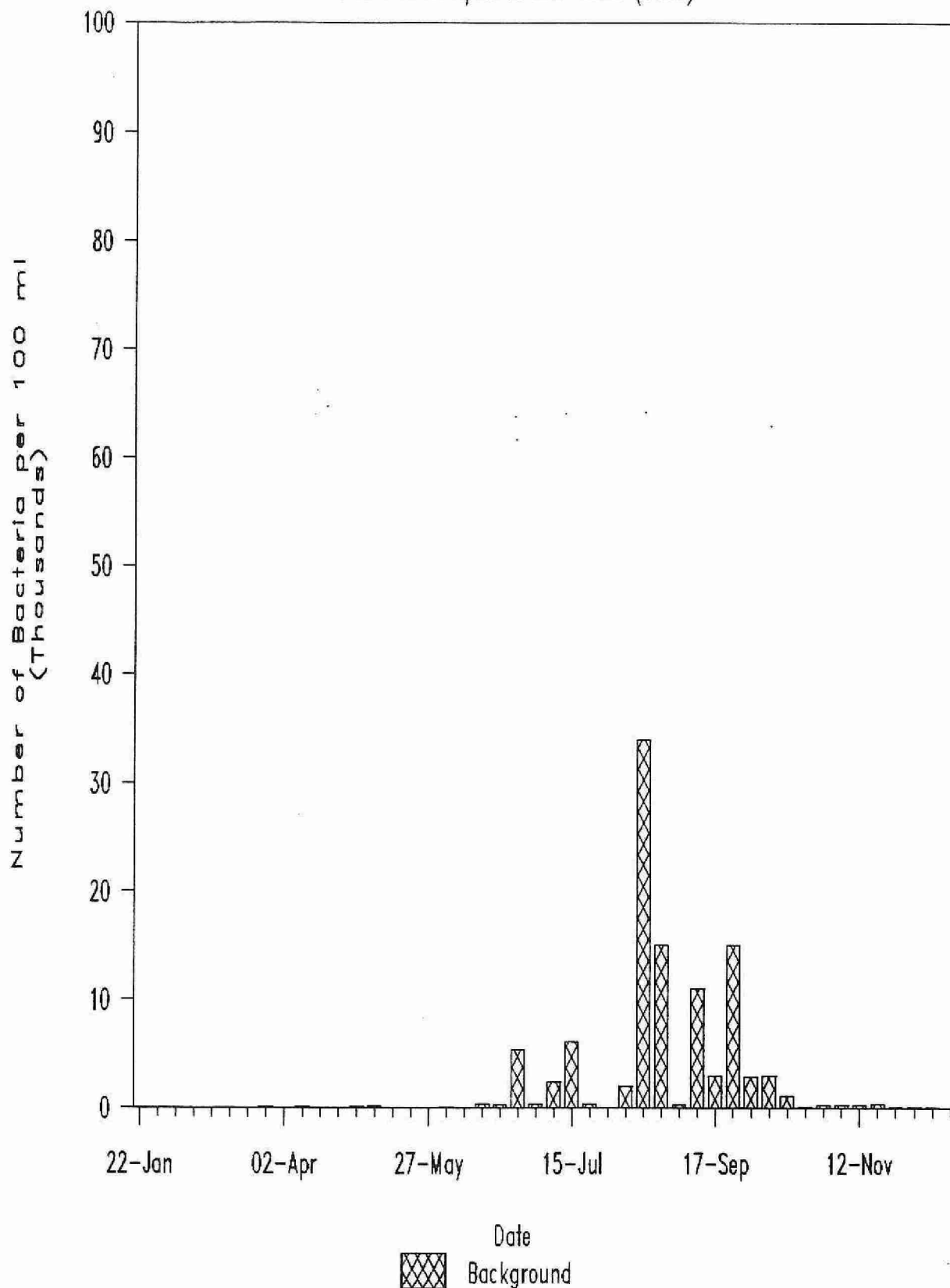
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Bacterial Analysis of Raw Water (1992)



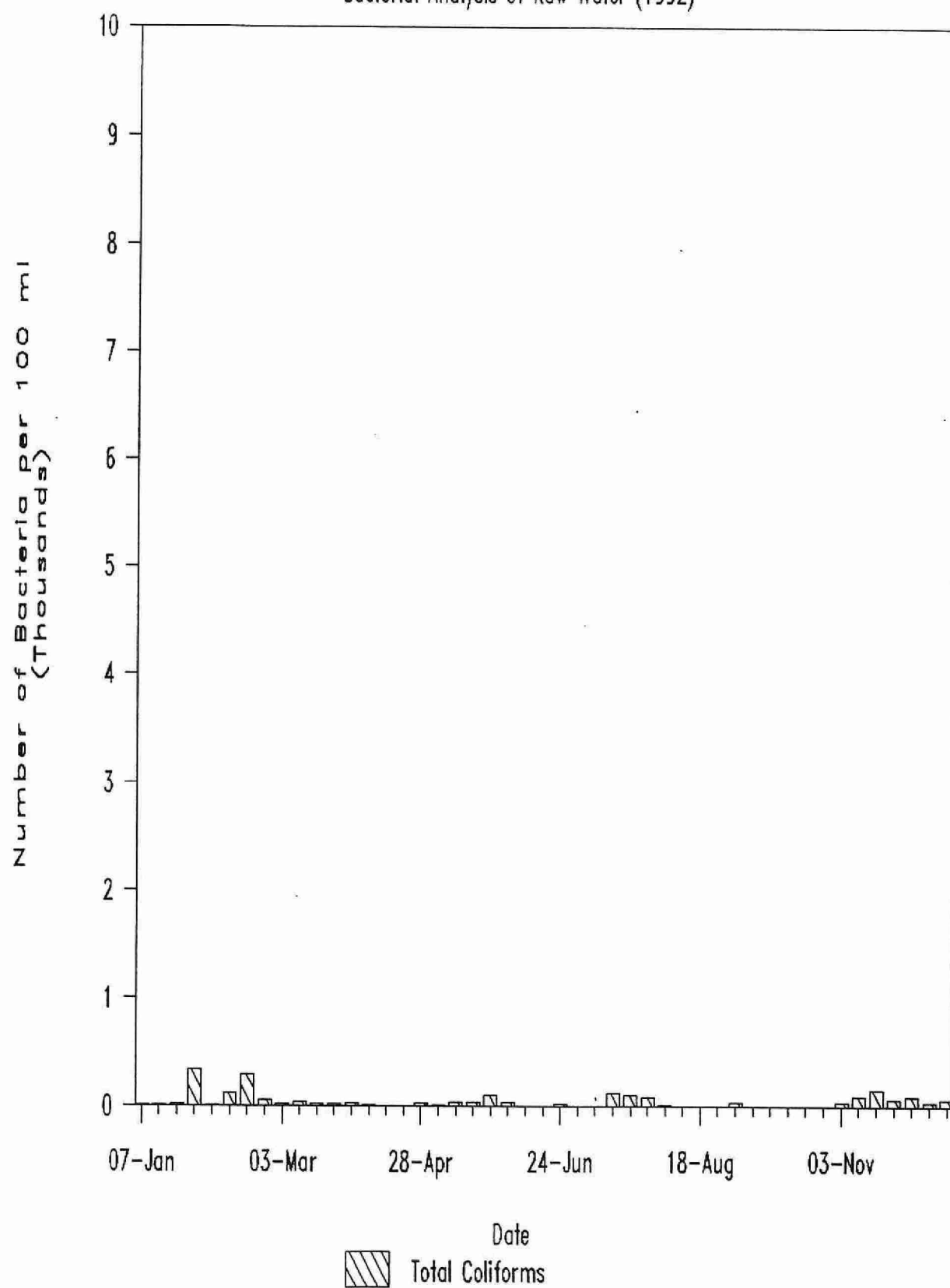
COBDEN

Bacterial Analysis of Raw Water (1992)



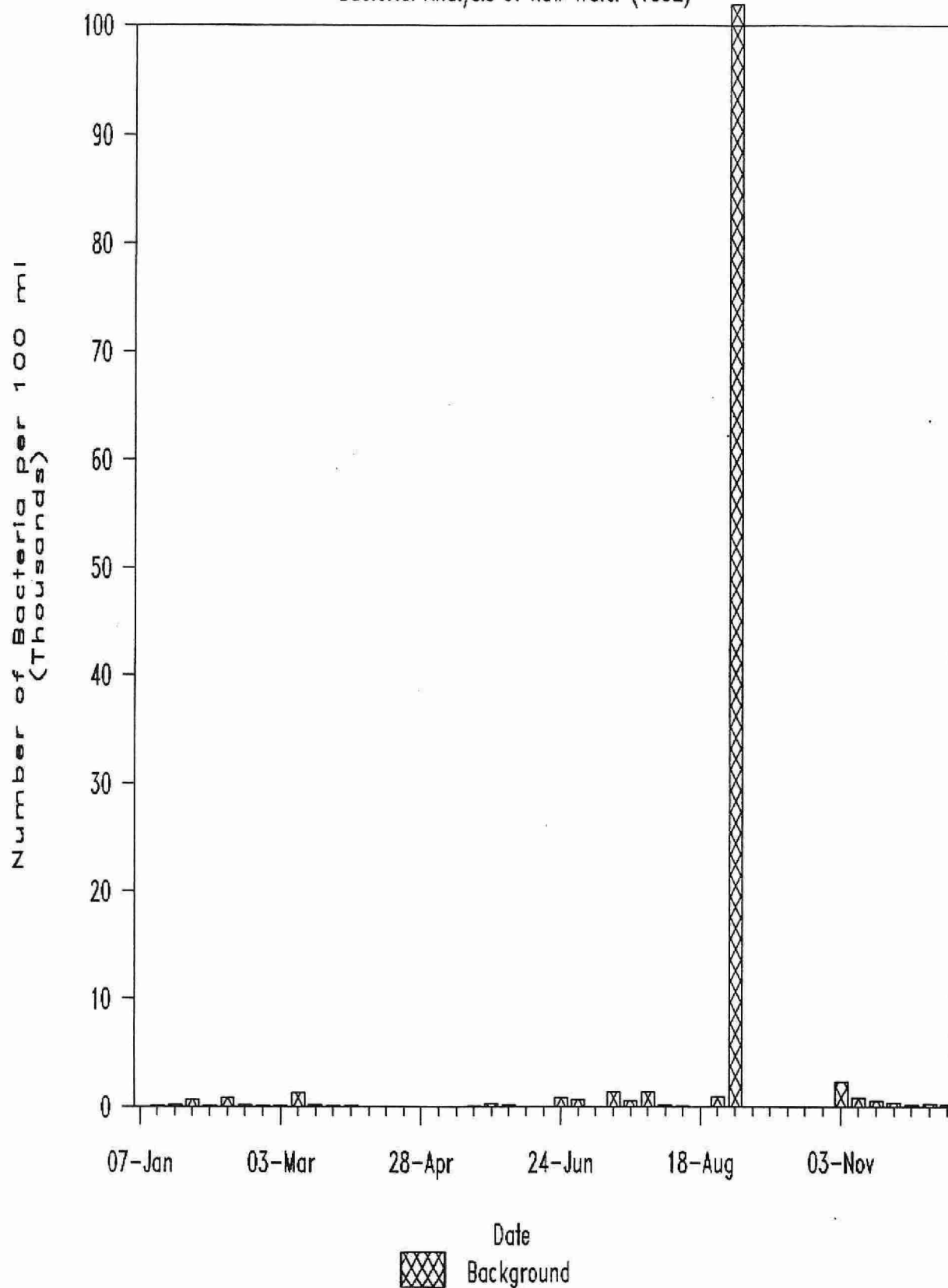
CORNWALL (CITY)

Bacterial Analysis of Raw Water (1992)



CORNWALL (CITY)

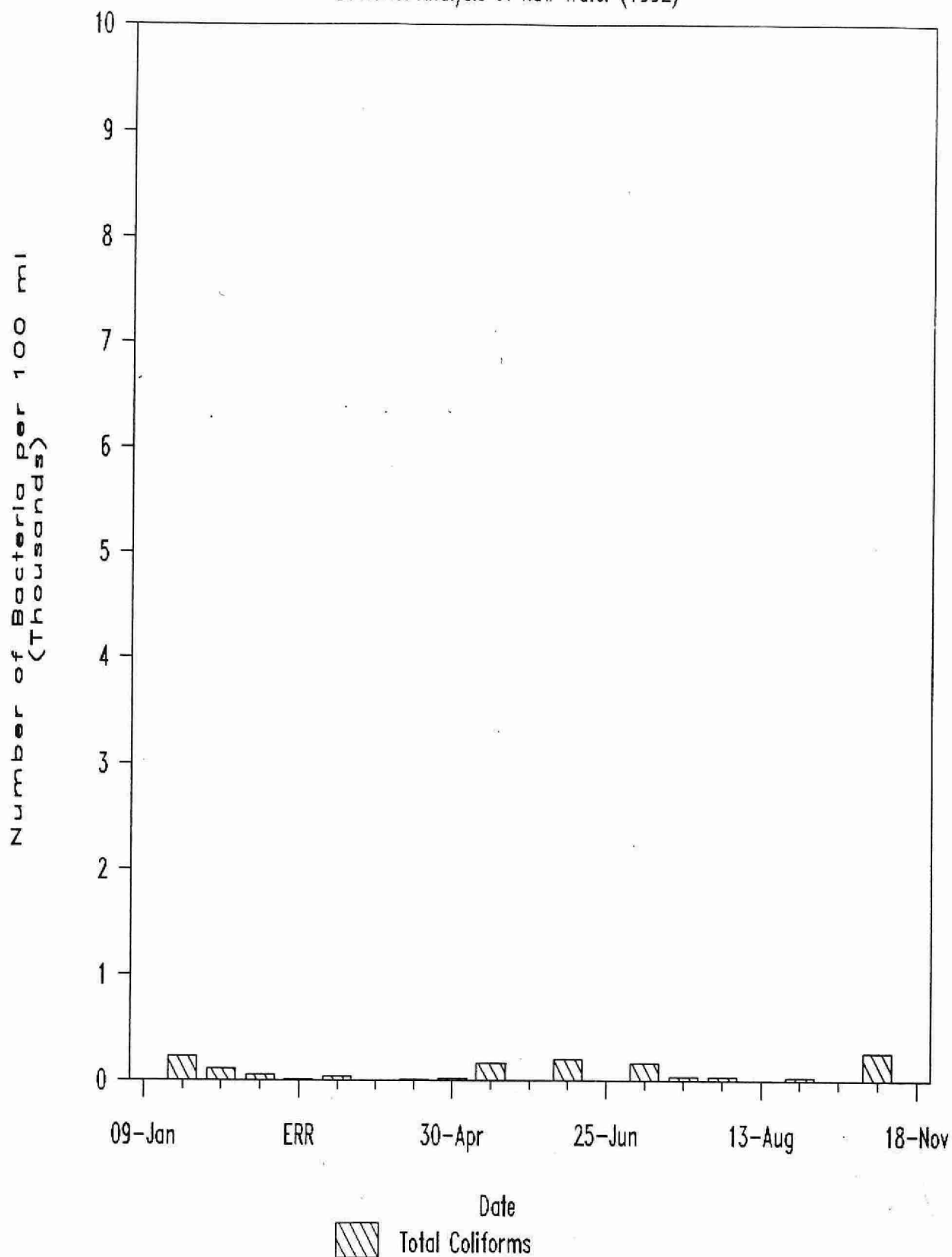
Bacterial Analysis of Raw Water (1992)



CORNWALL TWP (WTP)

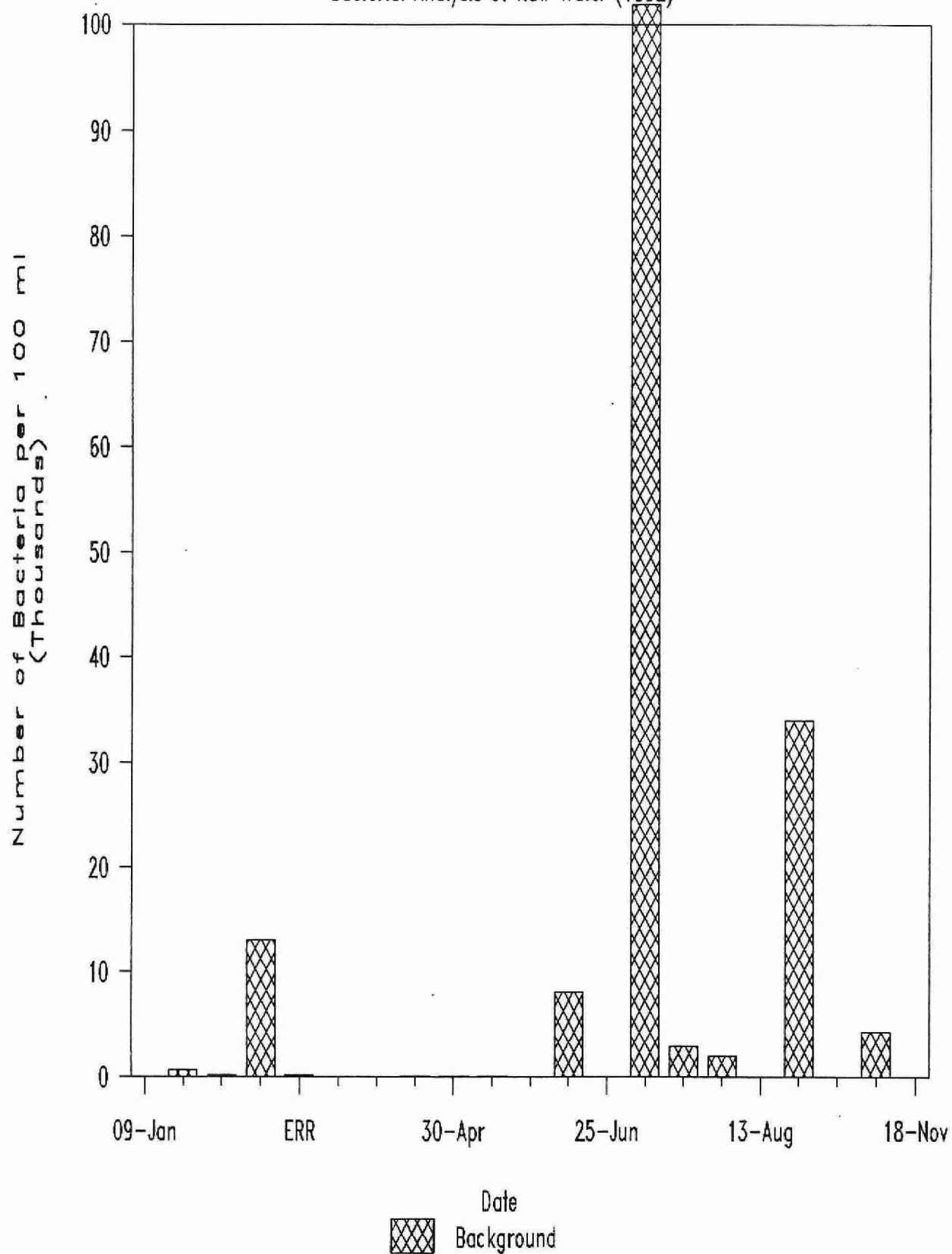
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Bacterial Analysis of Raw Water (1992)



CORNWALL TWP (WTP)

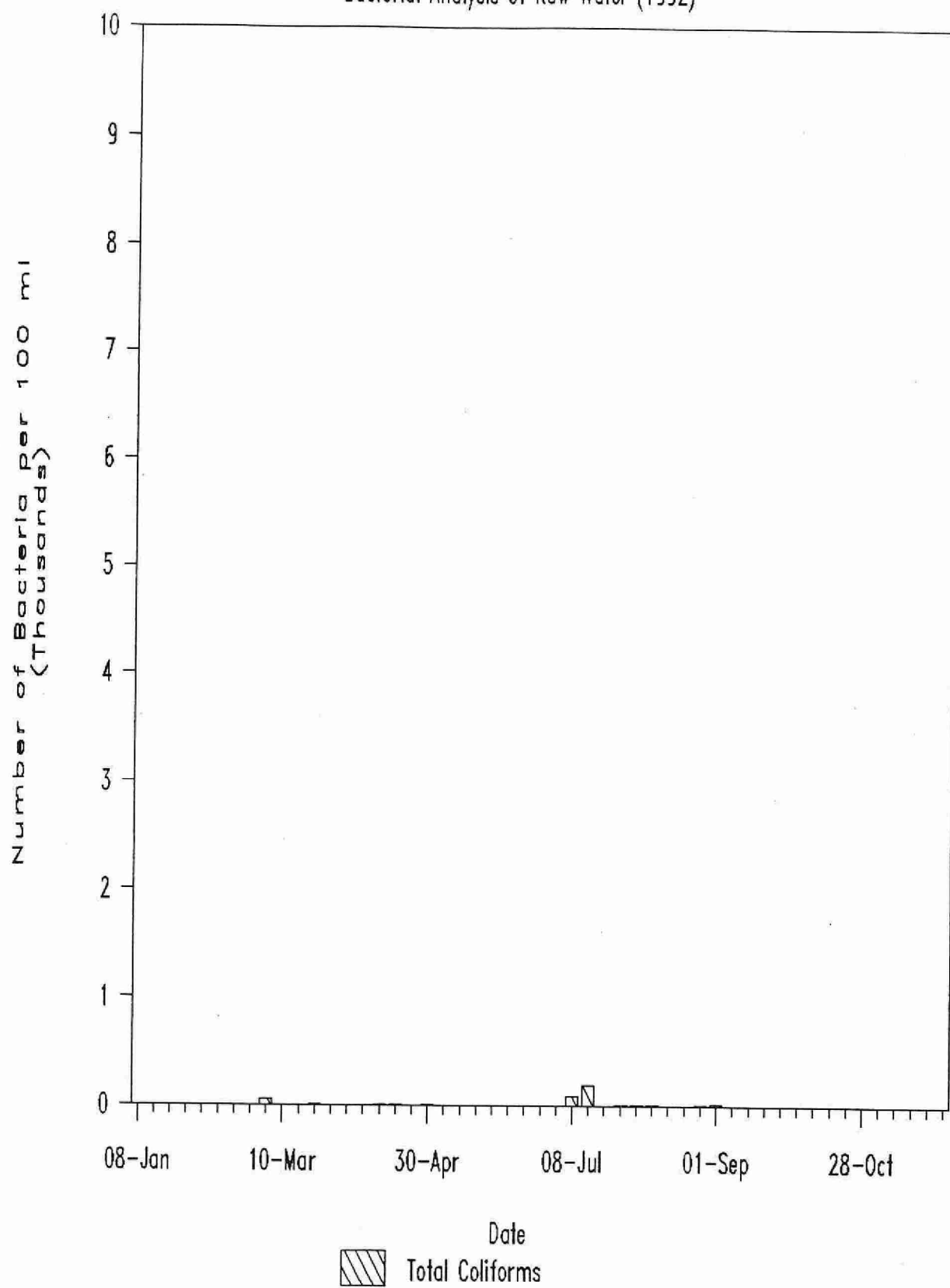
Bacterial Analysis of Raw Water (1992)



DELORO

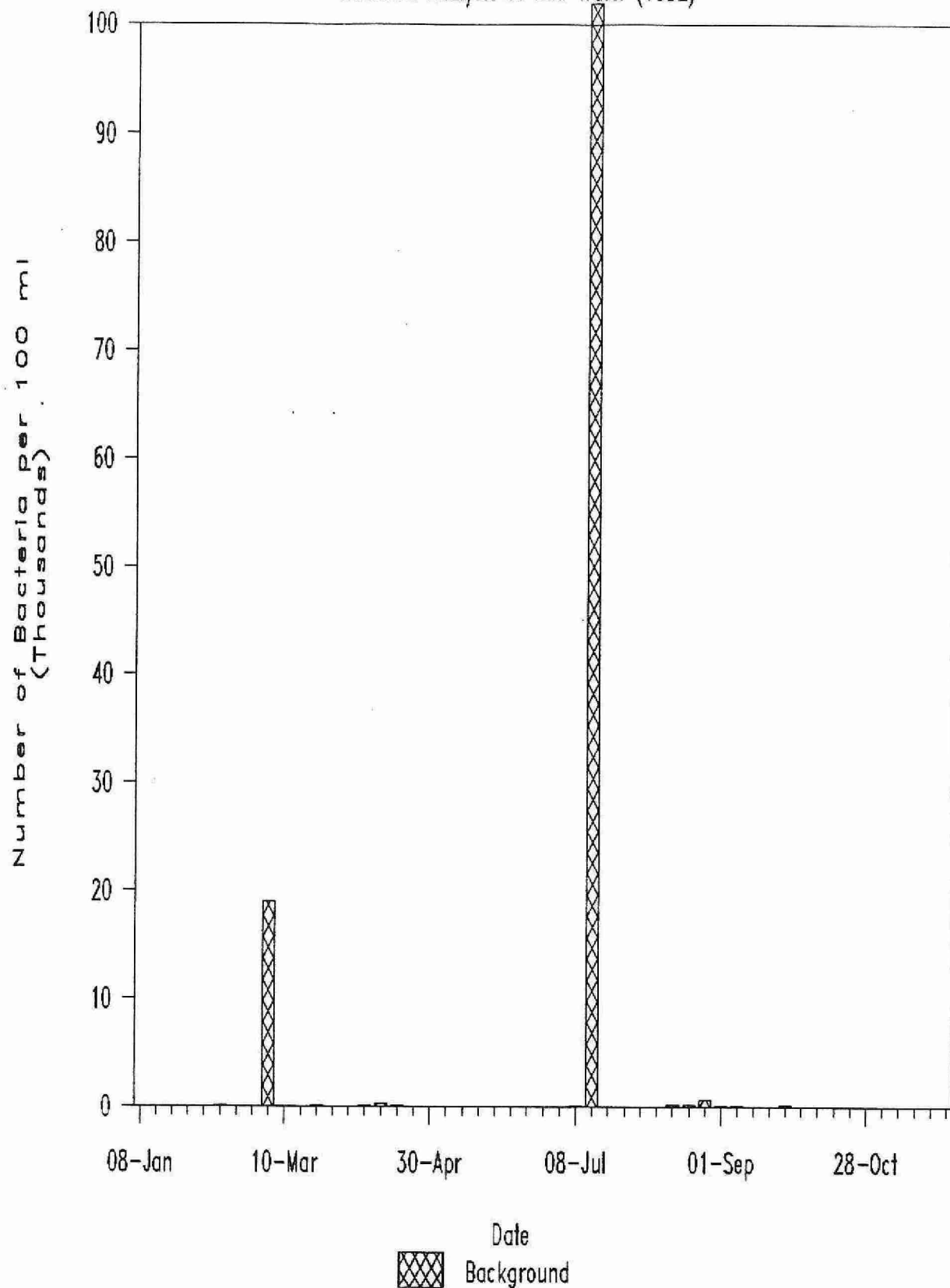
57

Bacterial Analysis of Raw Water (1992)



DELORO

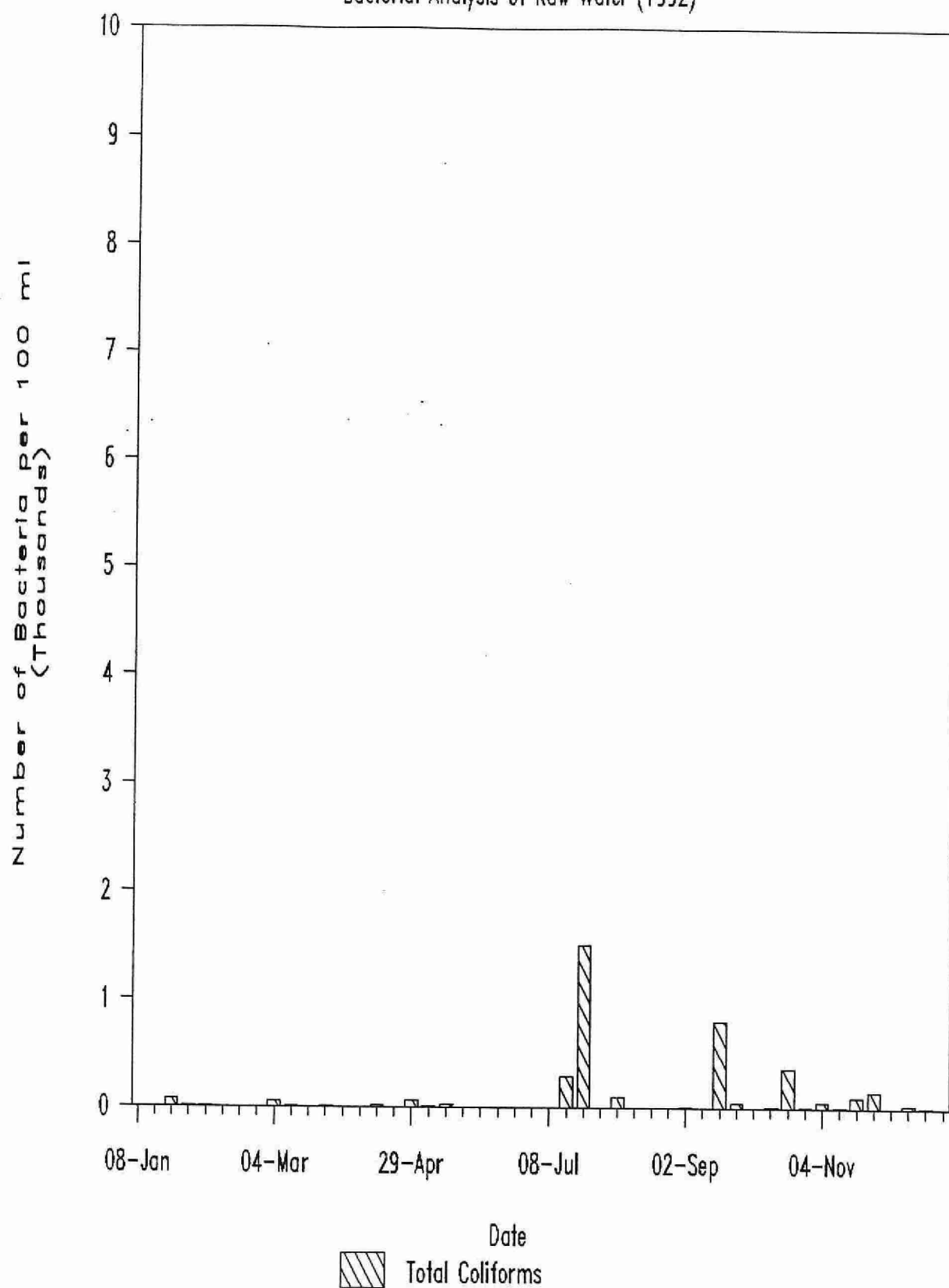
Bacterial Analysis of Raw Water (1992)



DESERONTO

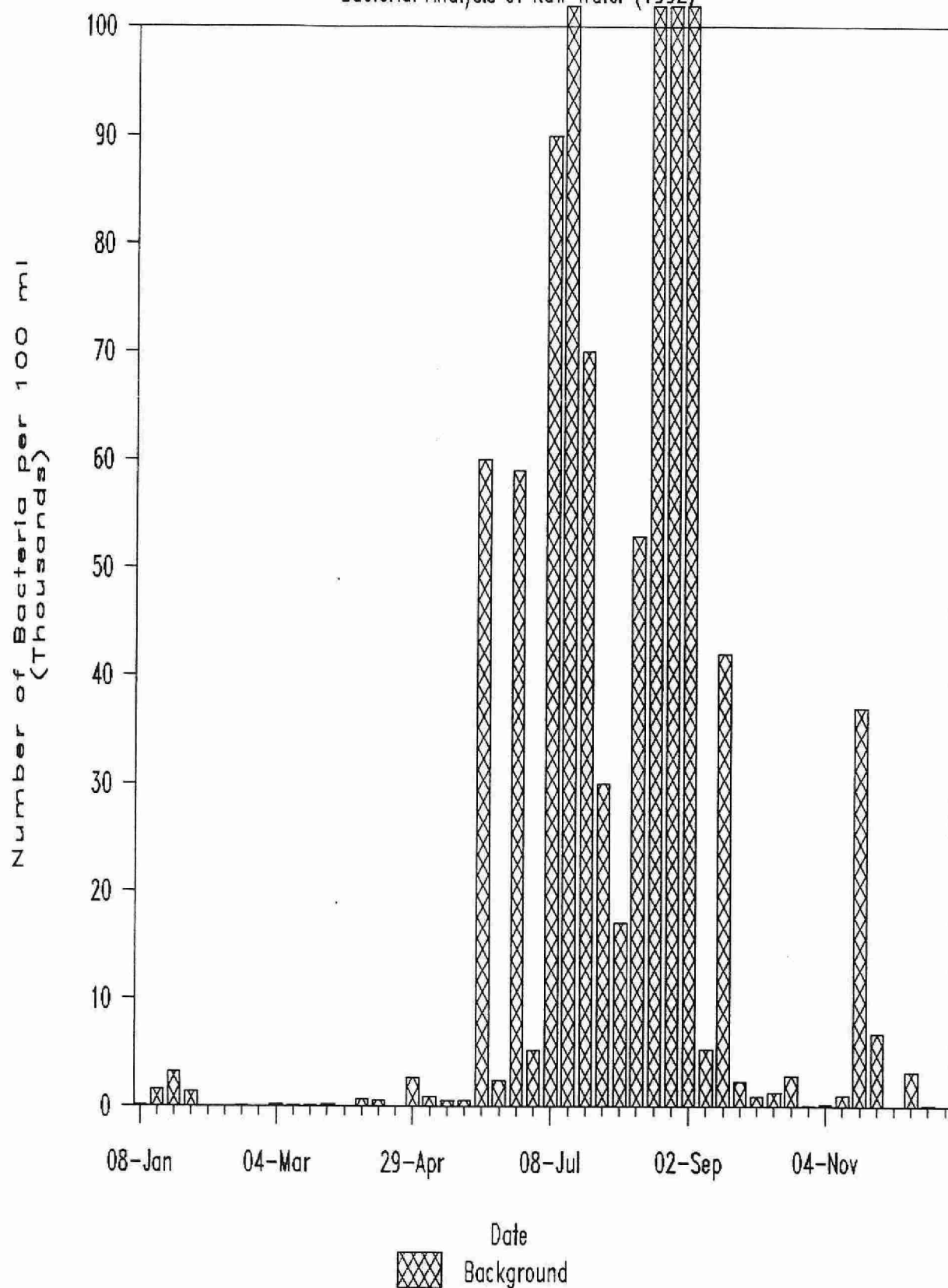
59

Bacterial Analysis of Raw Water (1992)



DESERONTO

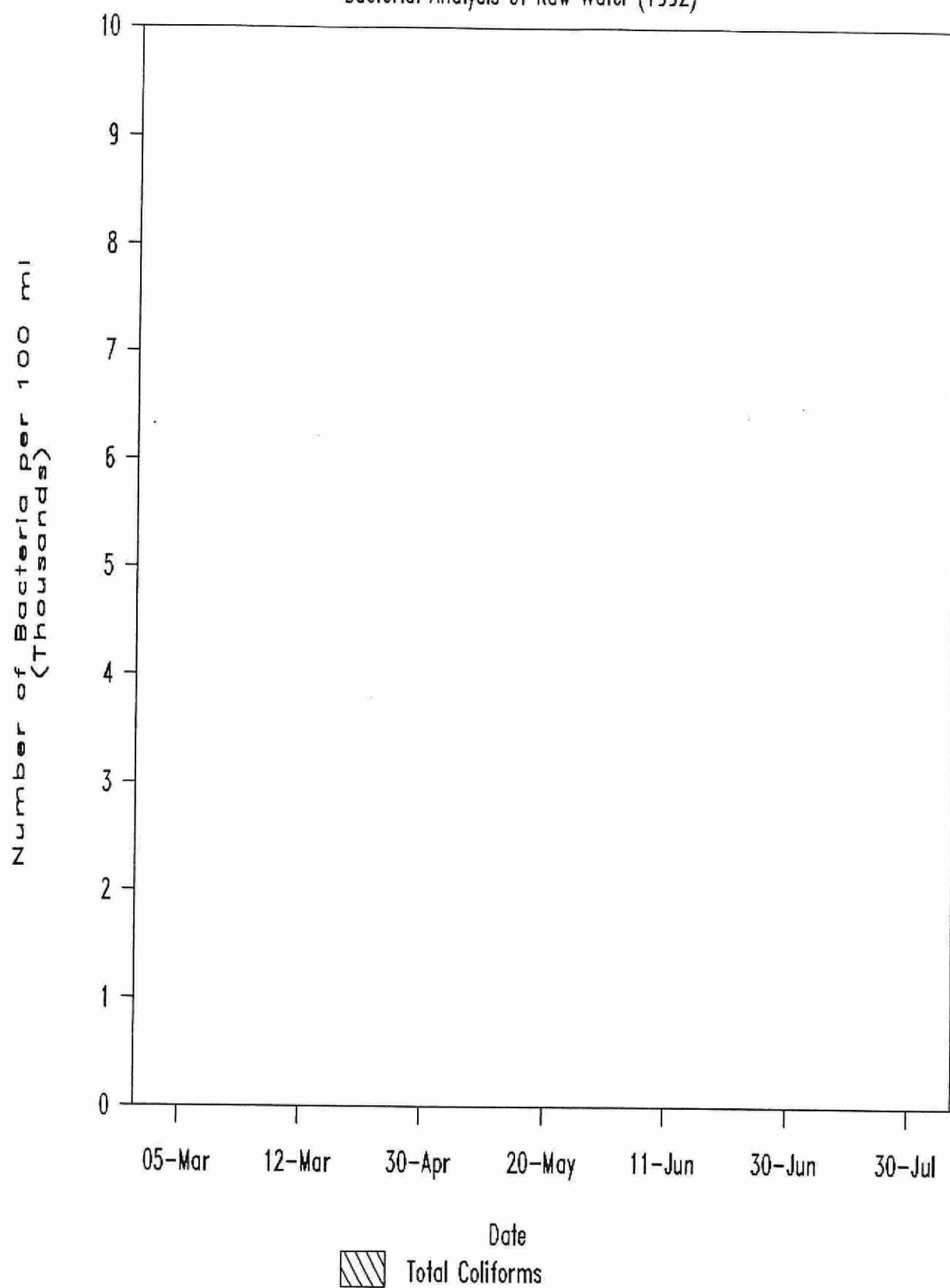
Bacterial Analysis of Raw Water (1992)



EDWARDSBURG TWP (PIRELLI)

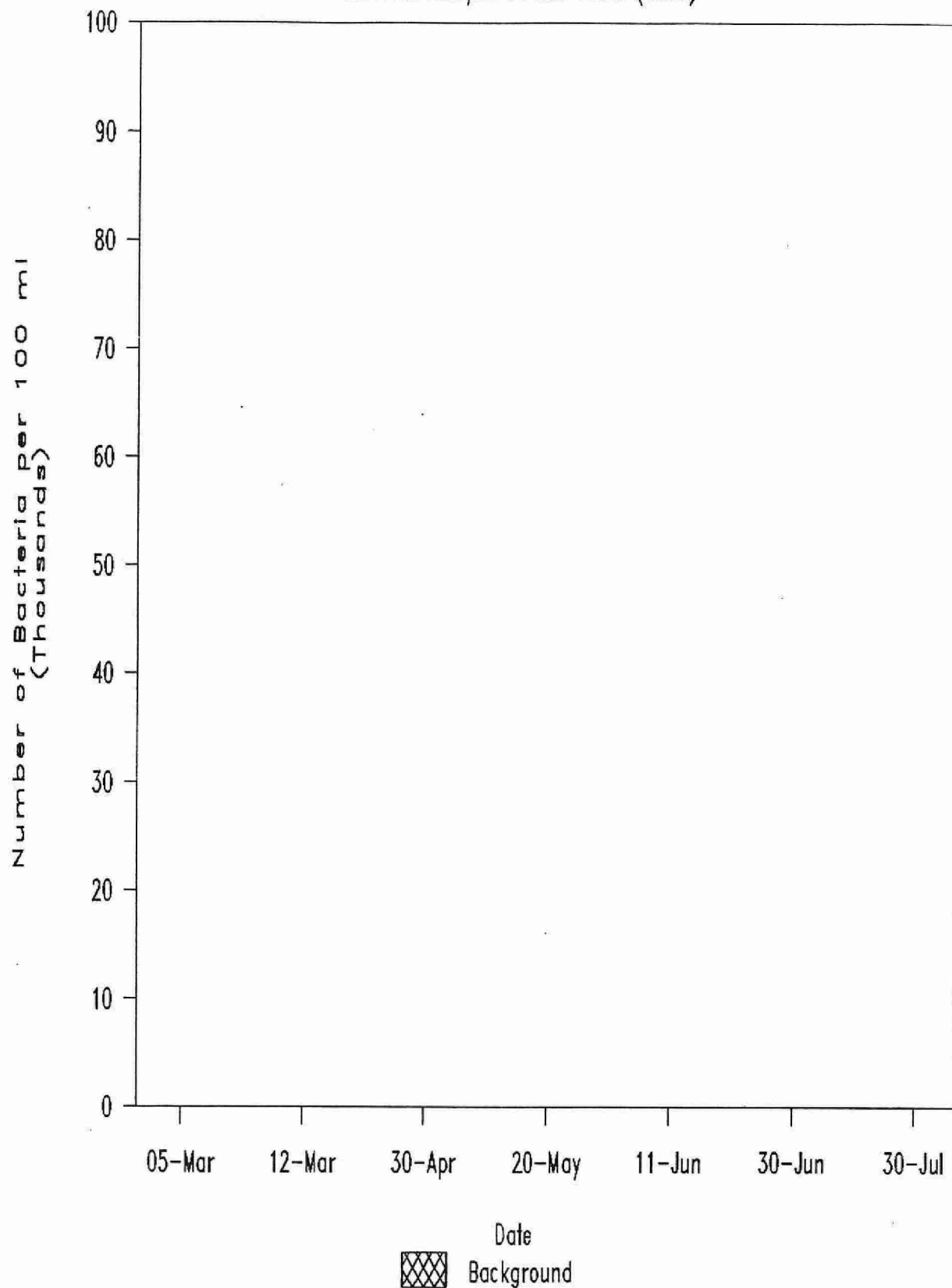
61

Bacterial Analysis of Raw Water (1992)



EDWARDSBURG TWP (PIRELLI)

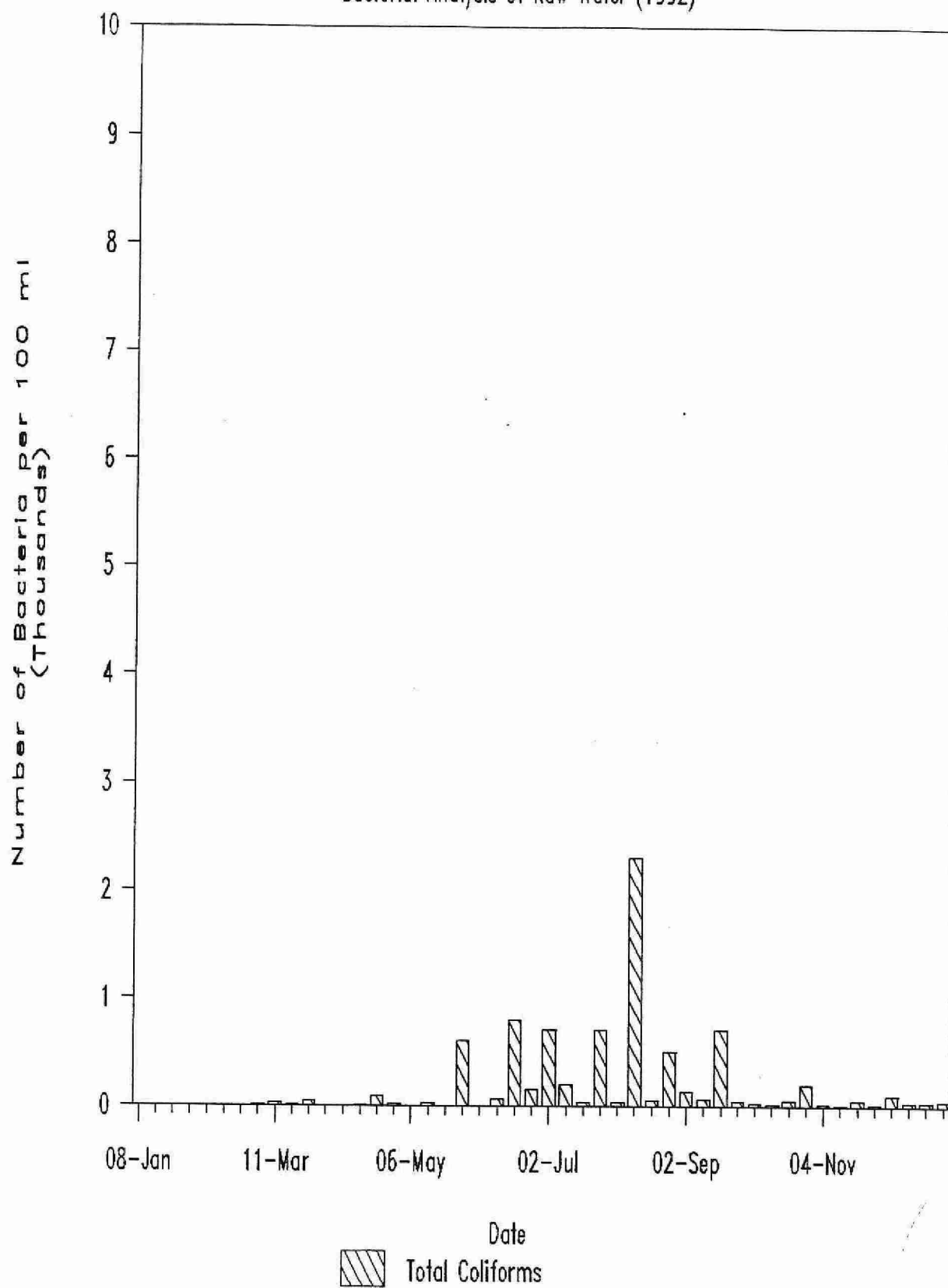
Bacterial Analysis of Raw Water (1992)



EGANVILLE

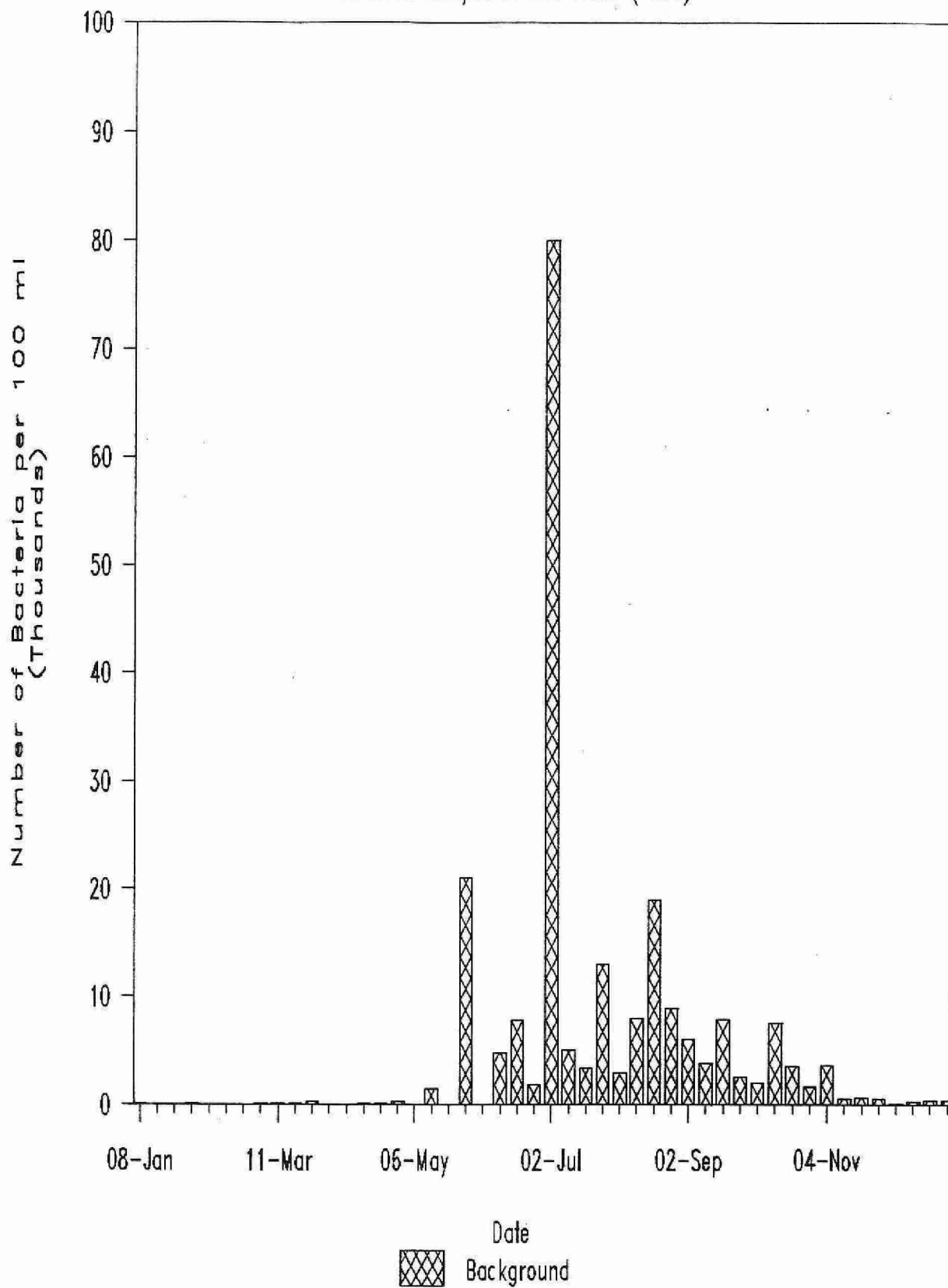
63

Bacterial Analysis of Raw Water (1992)



EGANVILLE

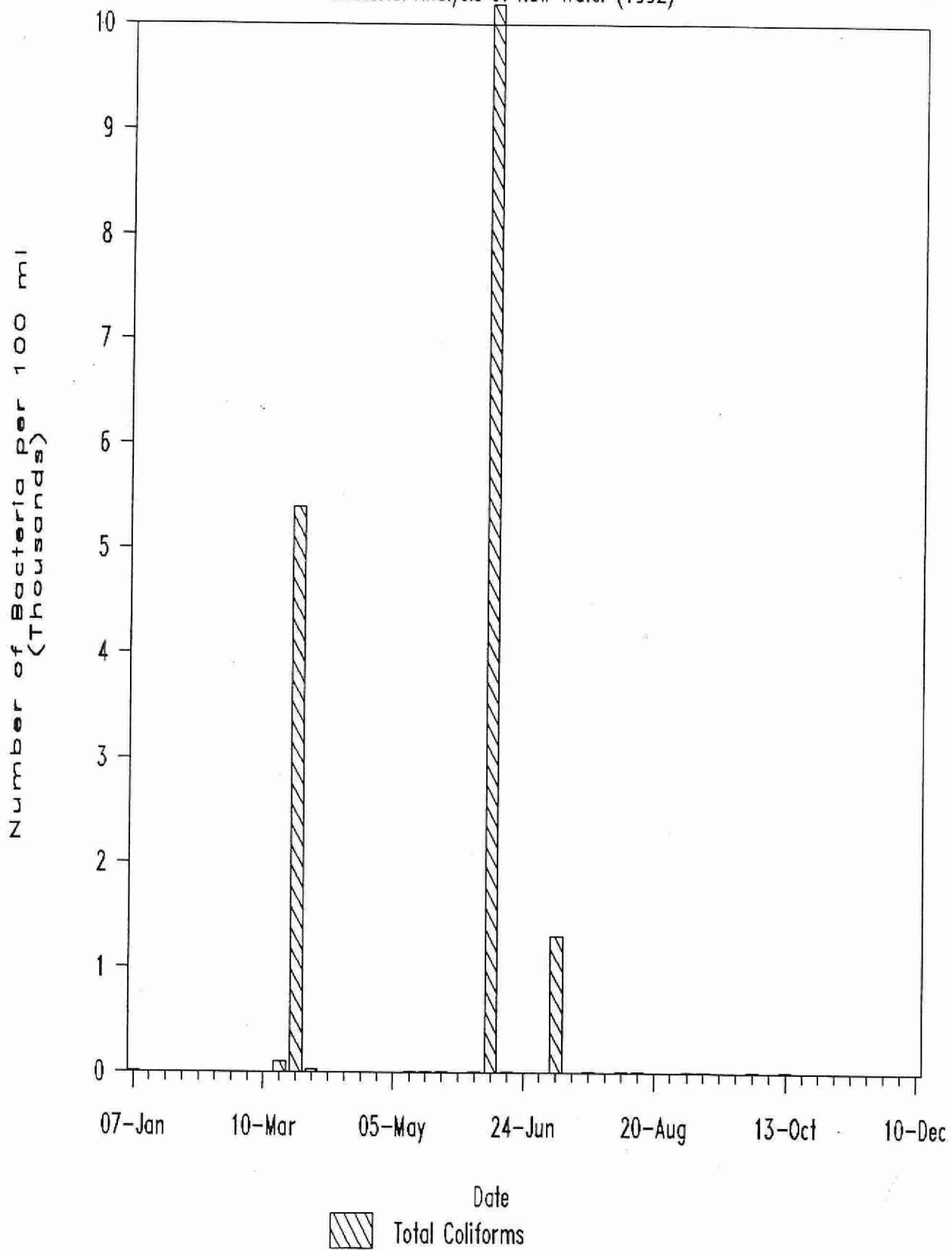
Bacterial Analysis of Raw Water (1992)



ERNESTOWN (AMHERSTVIEW)

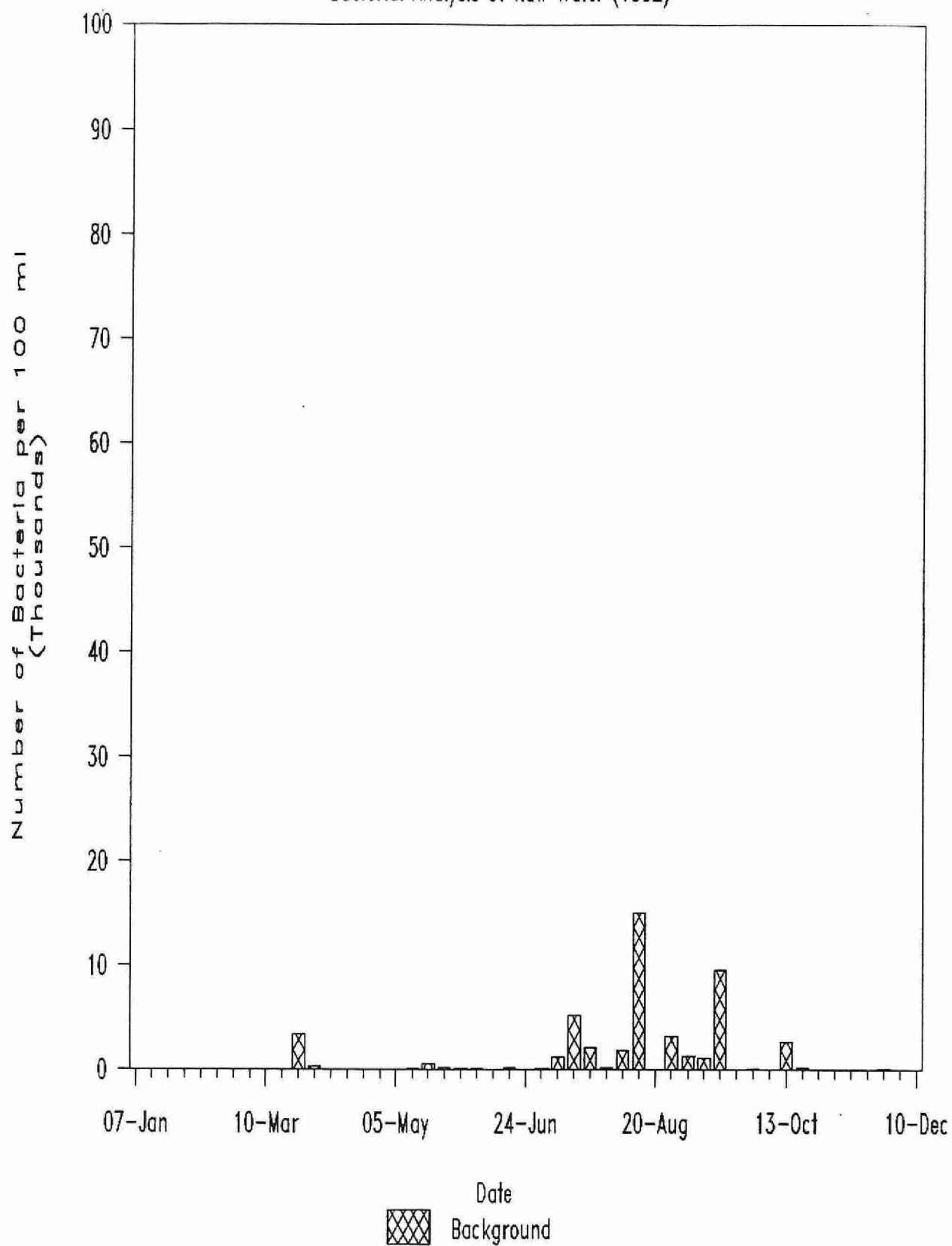
65

Bacterial Analysis of Raw Water (1992)



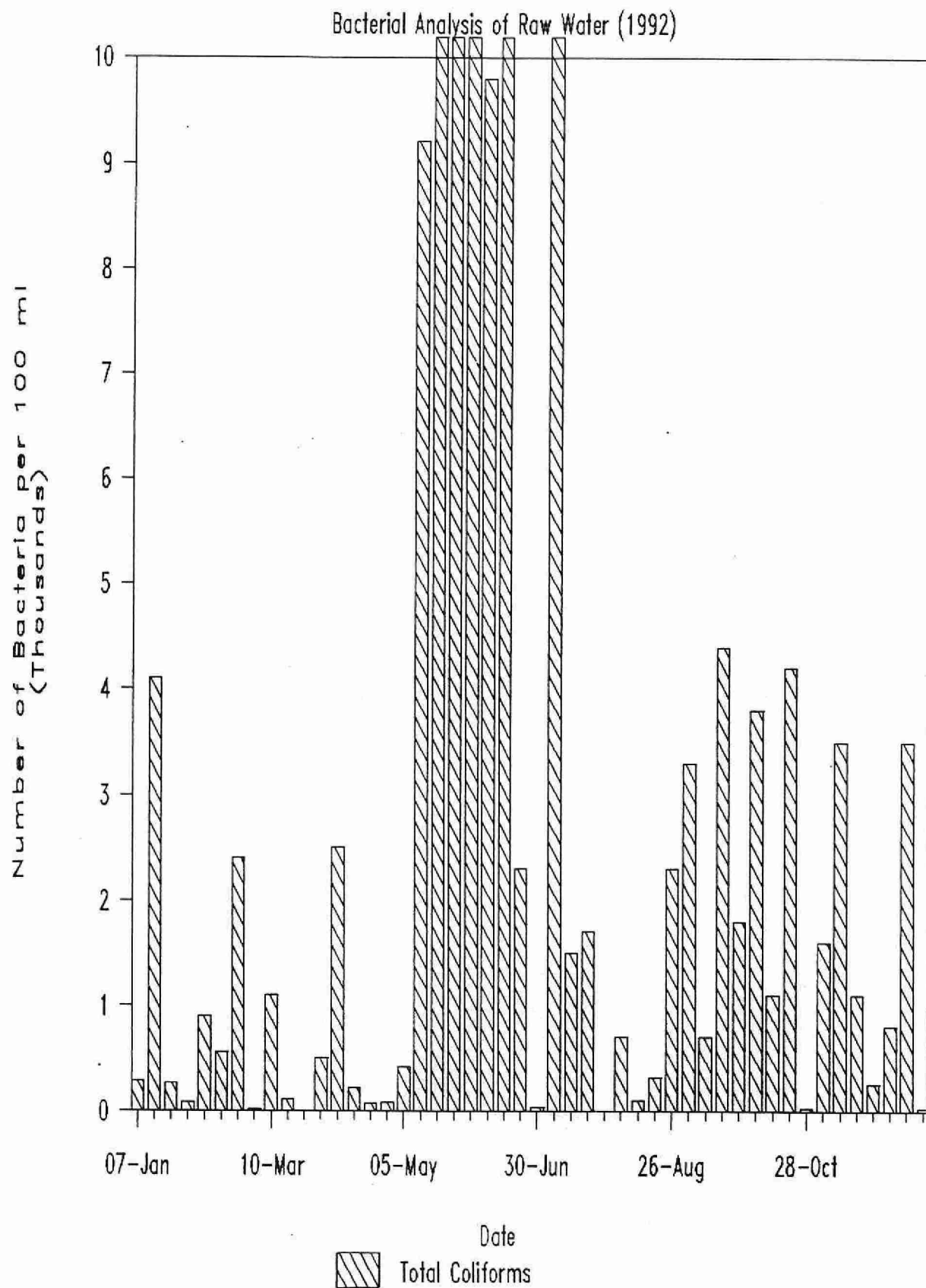
ERNESTOWN (AMHERSTVIEW)

Bacterial Analysis of Raw Water (1992)



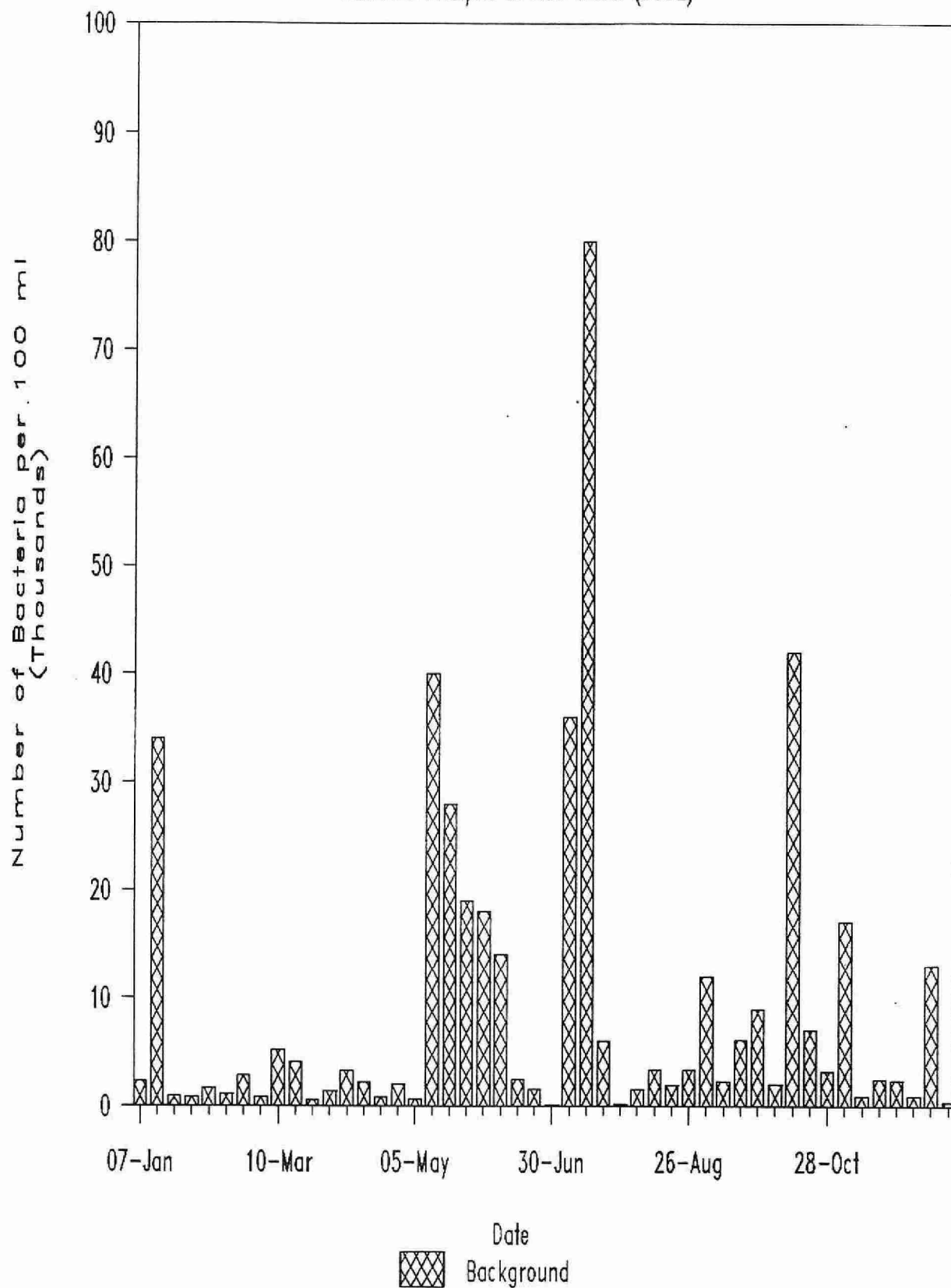
ERNESTOWN (BROOKLANDS)

67



ERNESTOWN (BROOKLANDS)

Bacterial Analysis of Raw Water (1992)

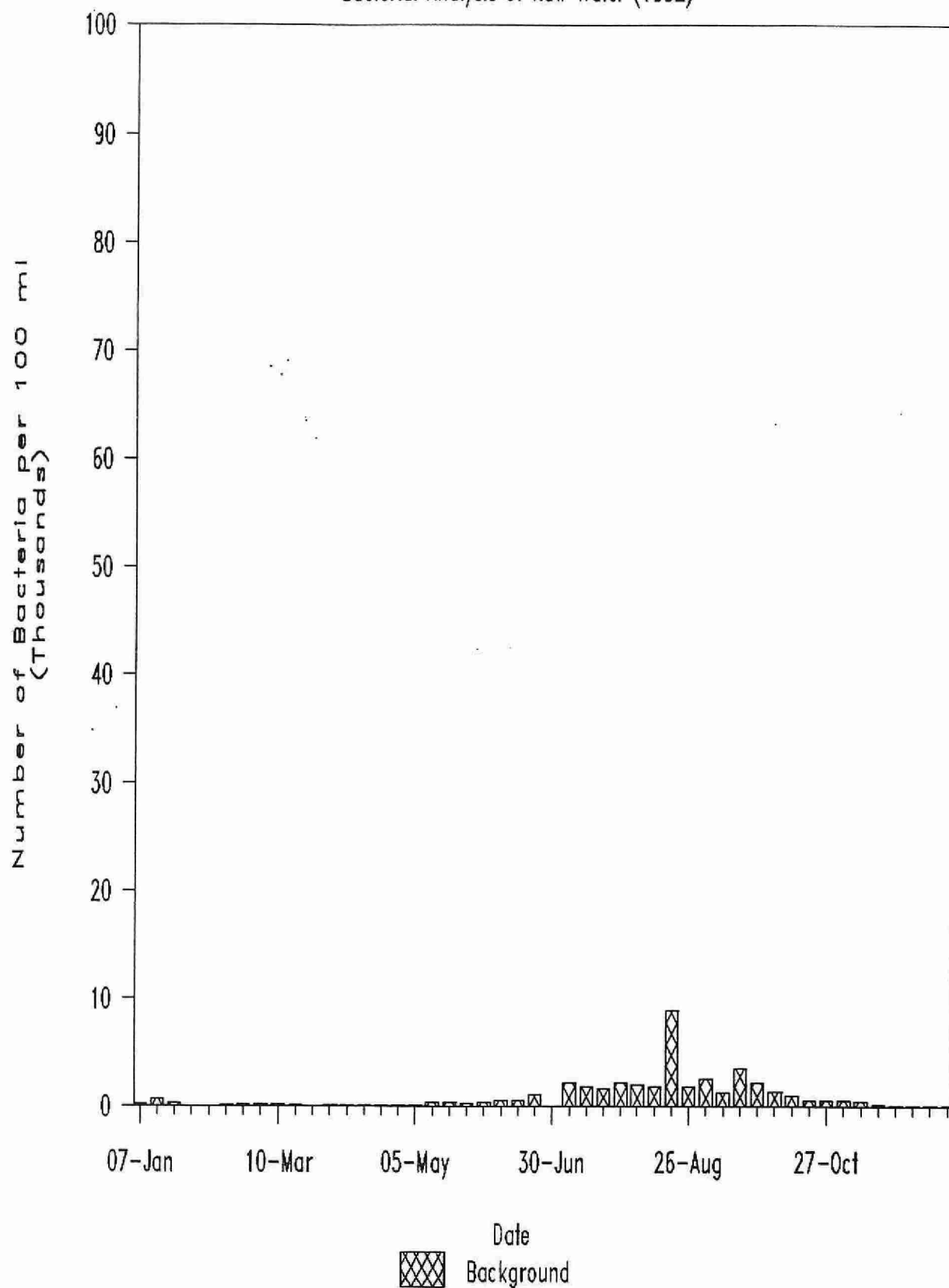


Number of Bacteria per 100 ml
(Thousands)



ERNESTOWN (HAREWOOD)

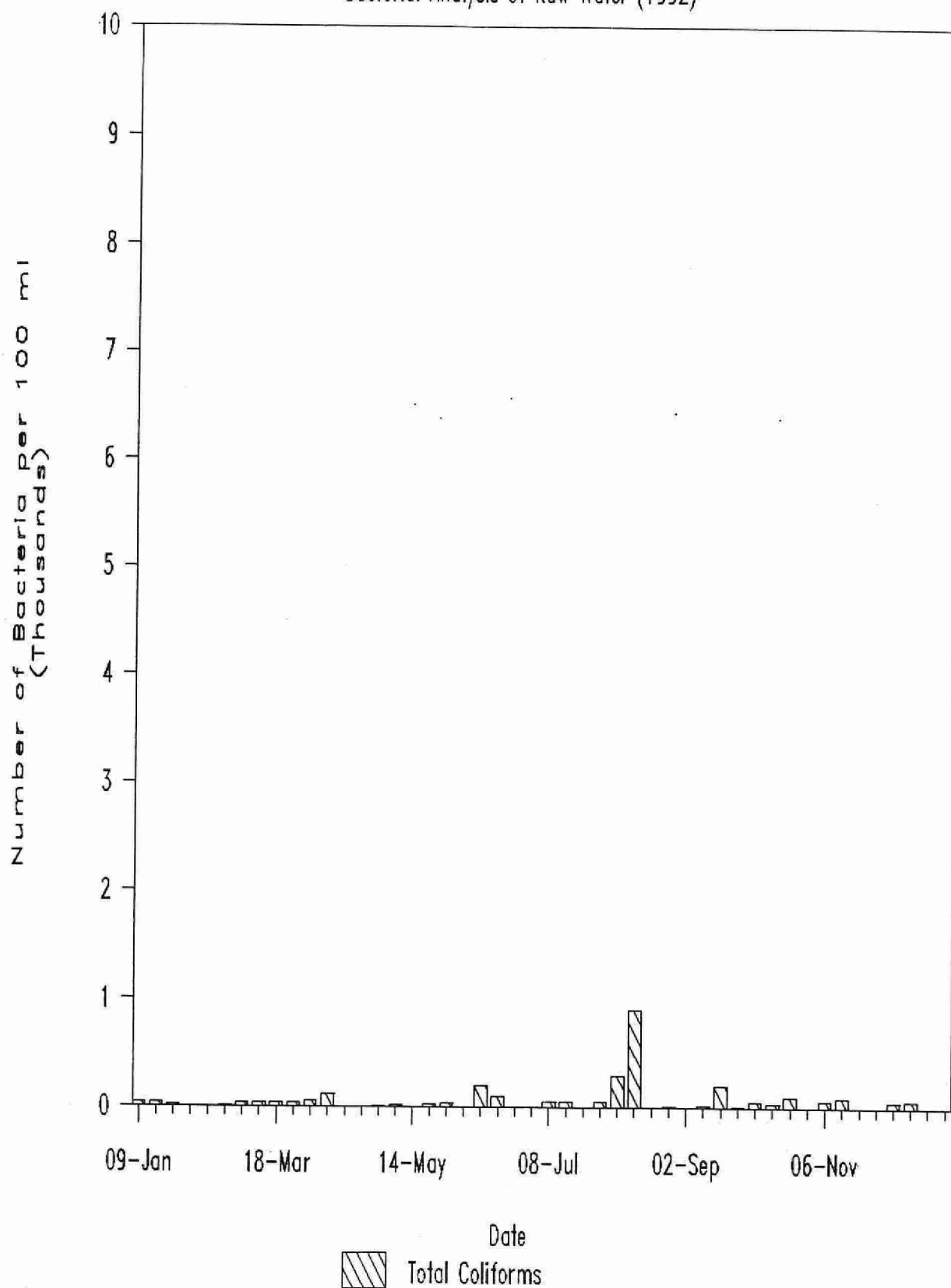
Bacterial Analysis of Raw Water (1992)



ERNESTOWN (ODESSA)

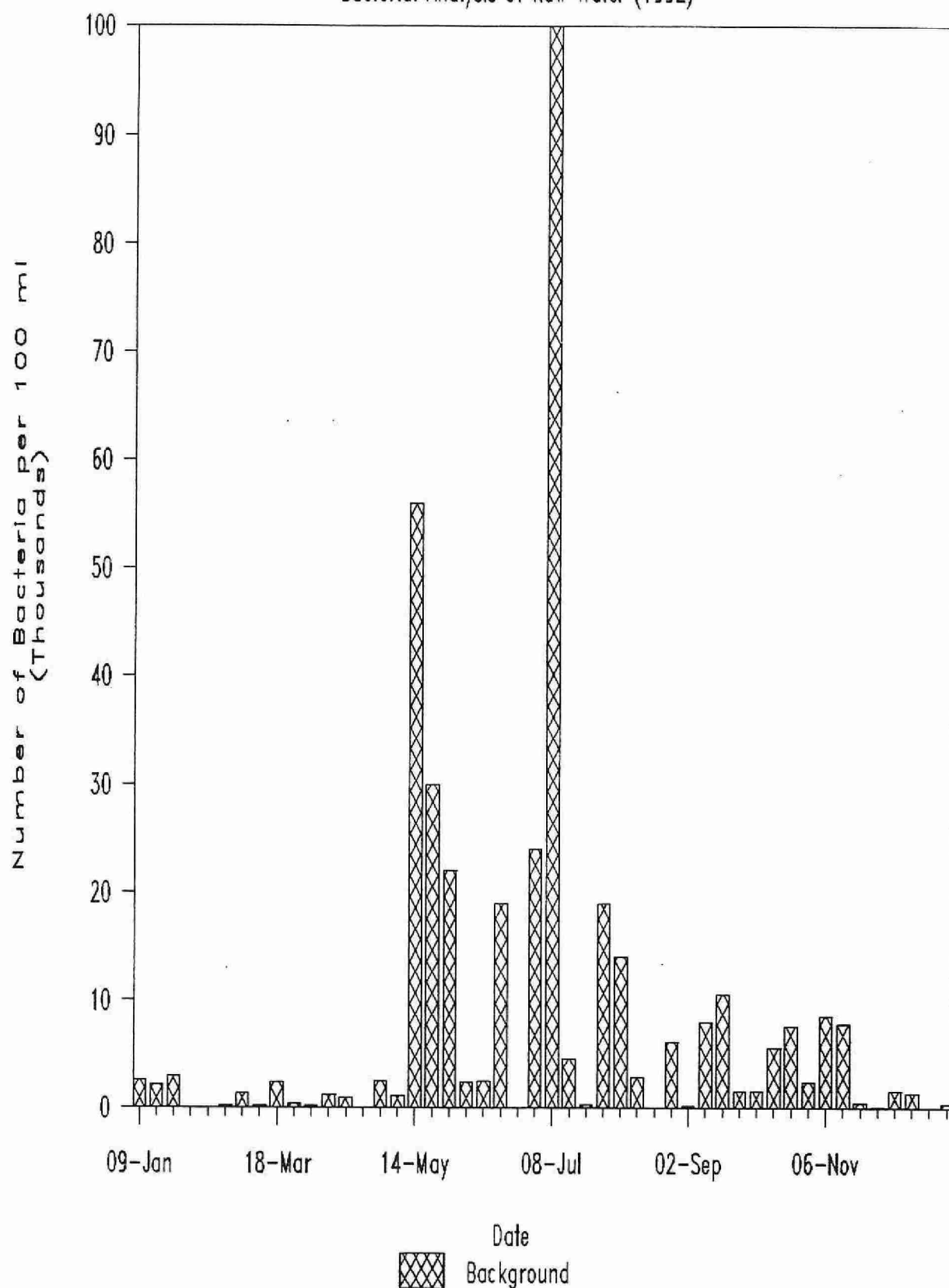
71

Bacterial Analysis of Raw Water (1992)

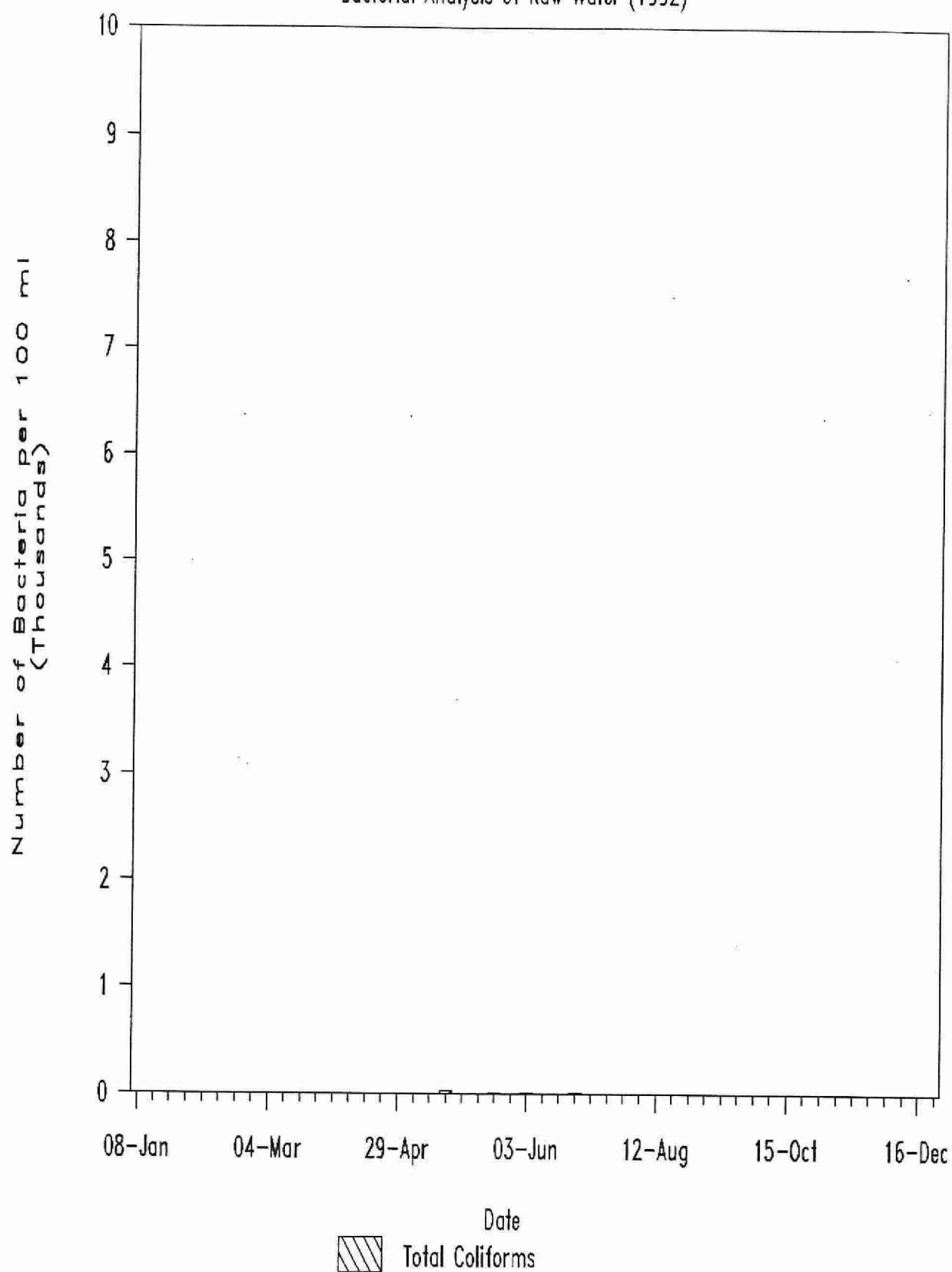


ERNESTOWN (ODESSA)

Bacterial Analysis of Raw Water (1992)

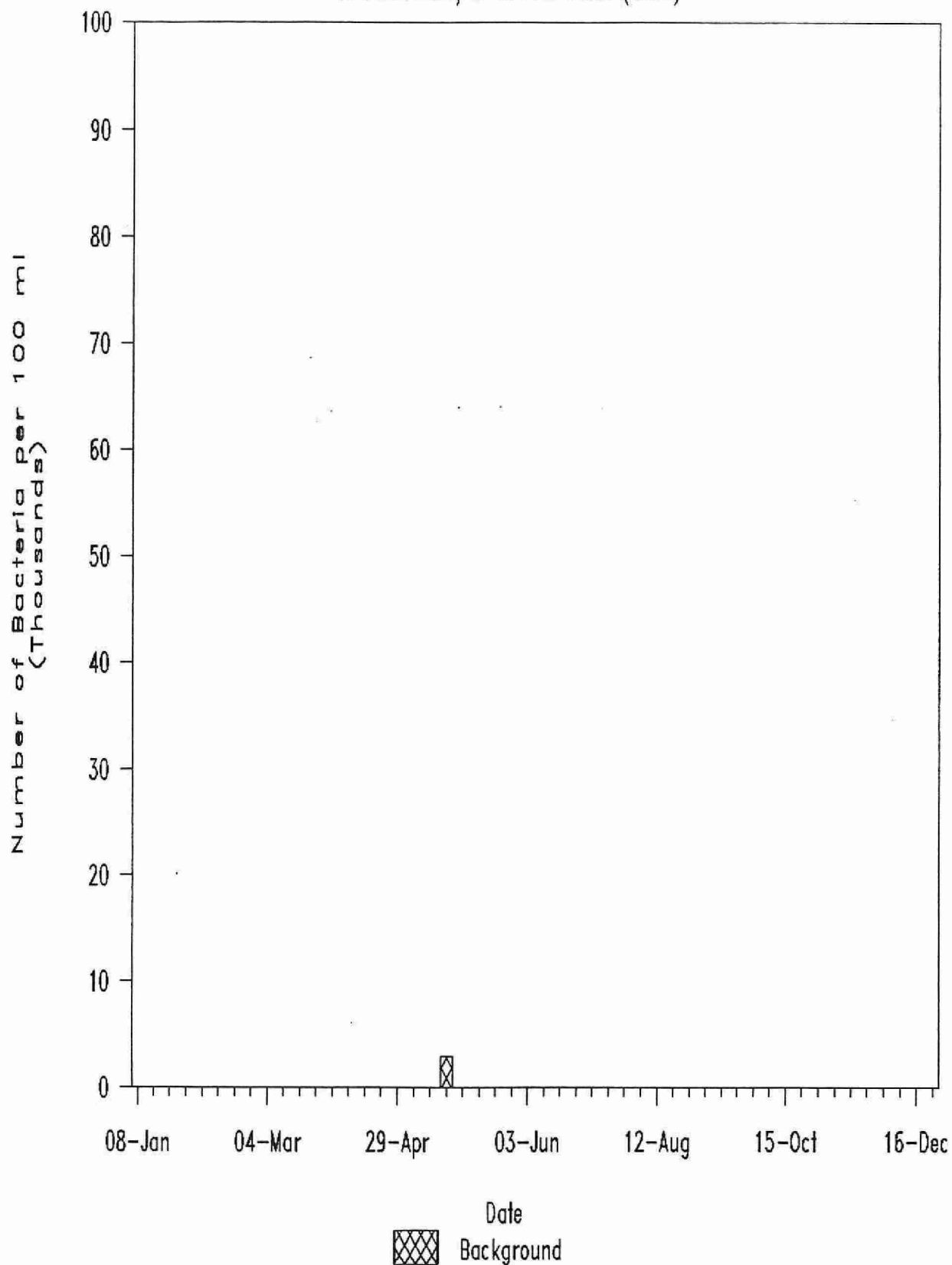


Bacterial Analysis of Raw Water (1992)



FINCH (UO)

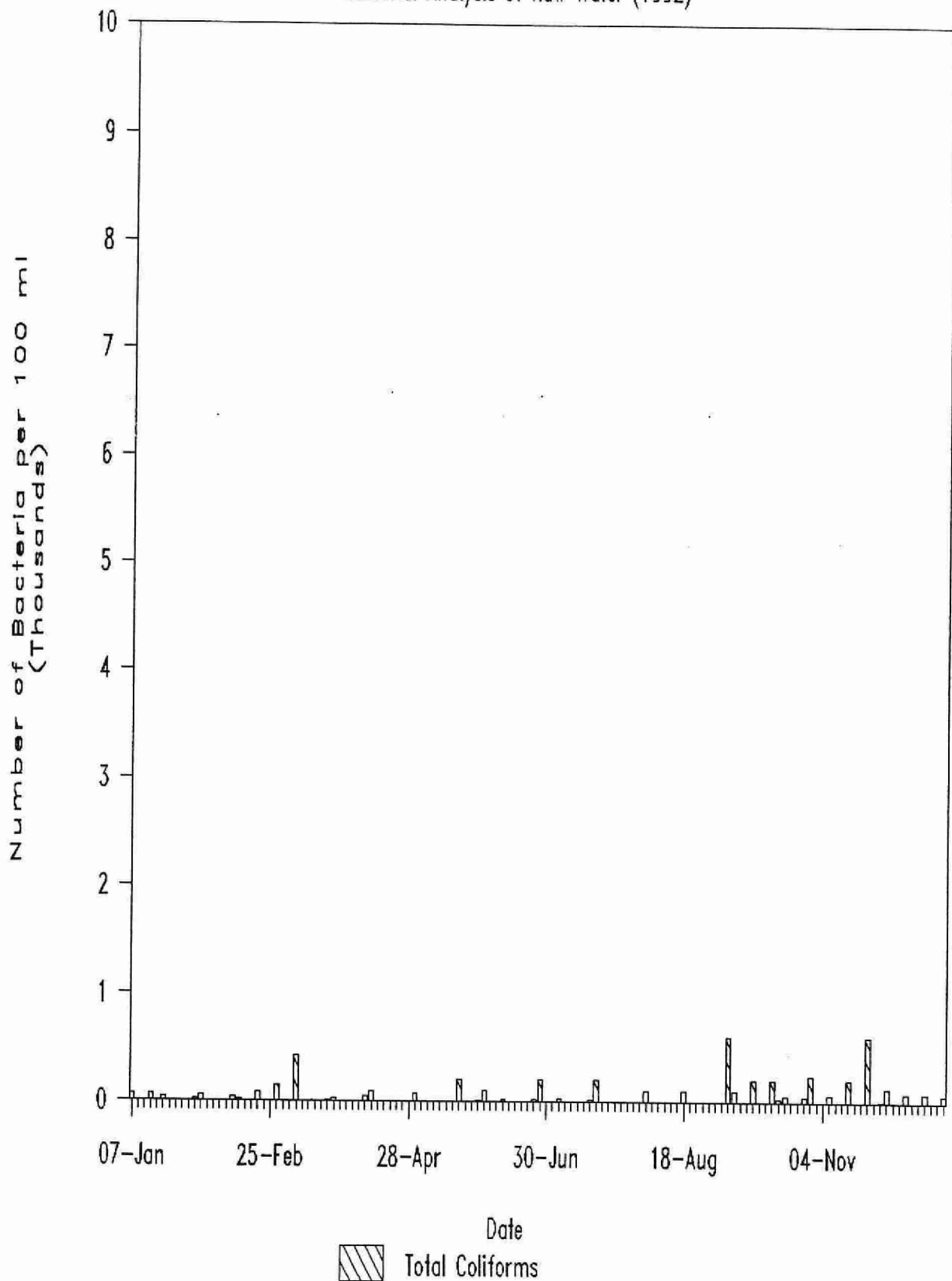
Bacterial Analysis of Raw Water (1992)



FRANKFORD

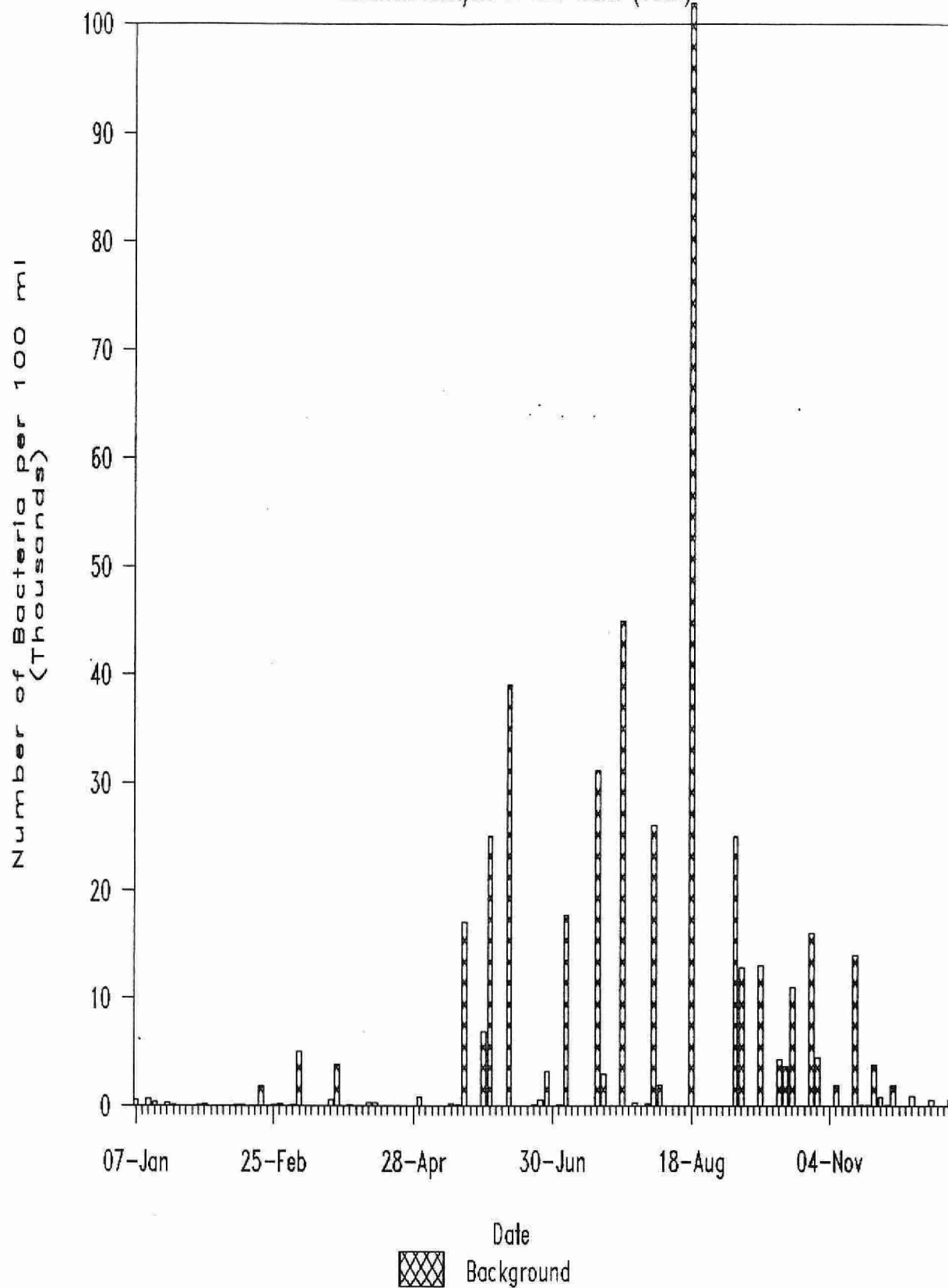
75

Bacterial Analysis of Raw Water (1992)



FRANKFORD

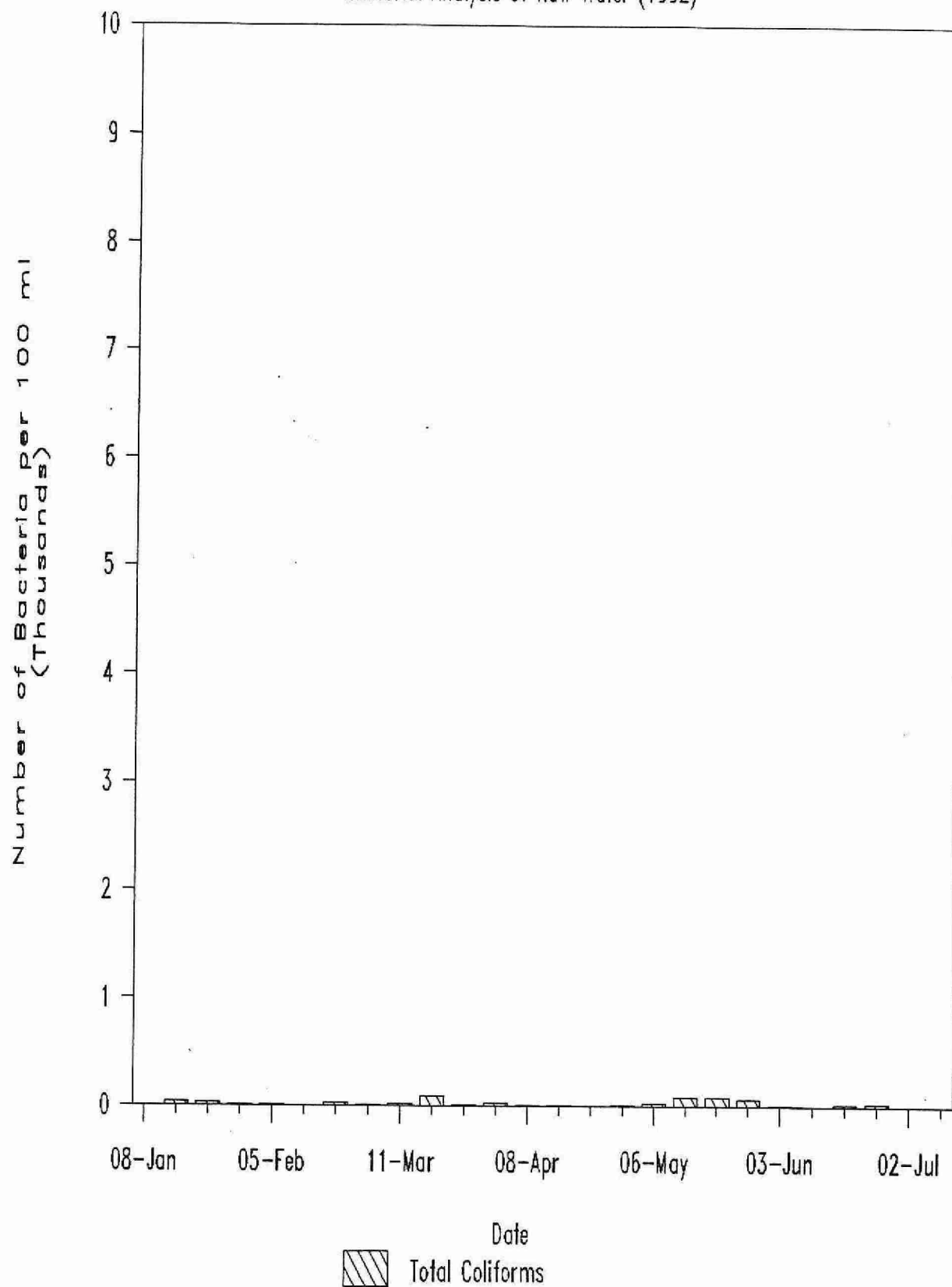
Bacterial Analysis of Raw Water (1992)



GANANOQUE

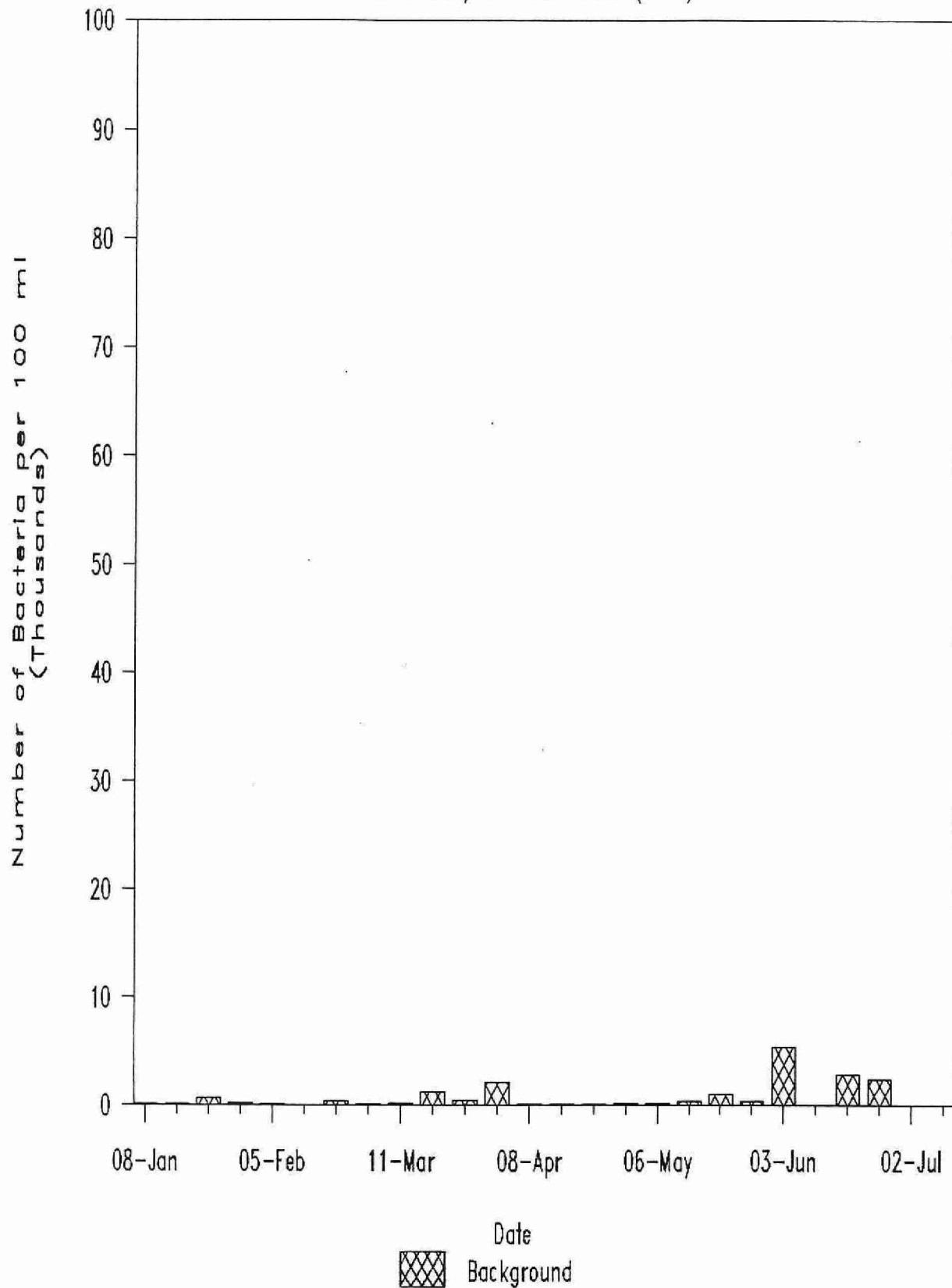
77

Bacterial Analysis of Raw Water (1992)



GANANOQUE

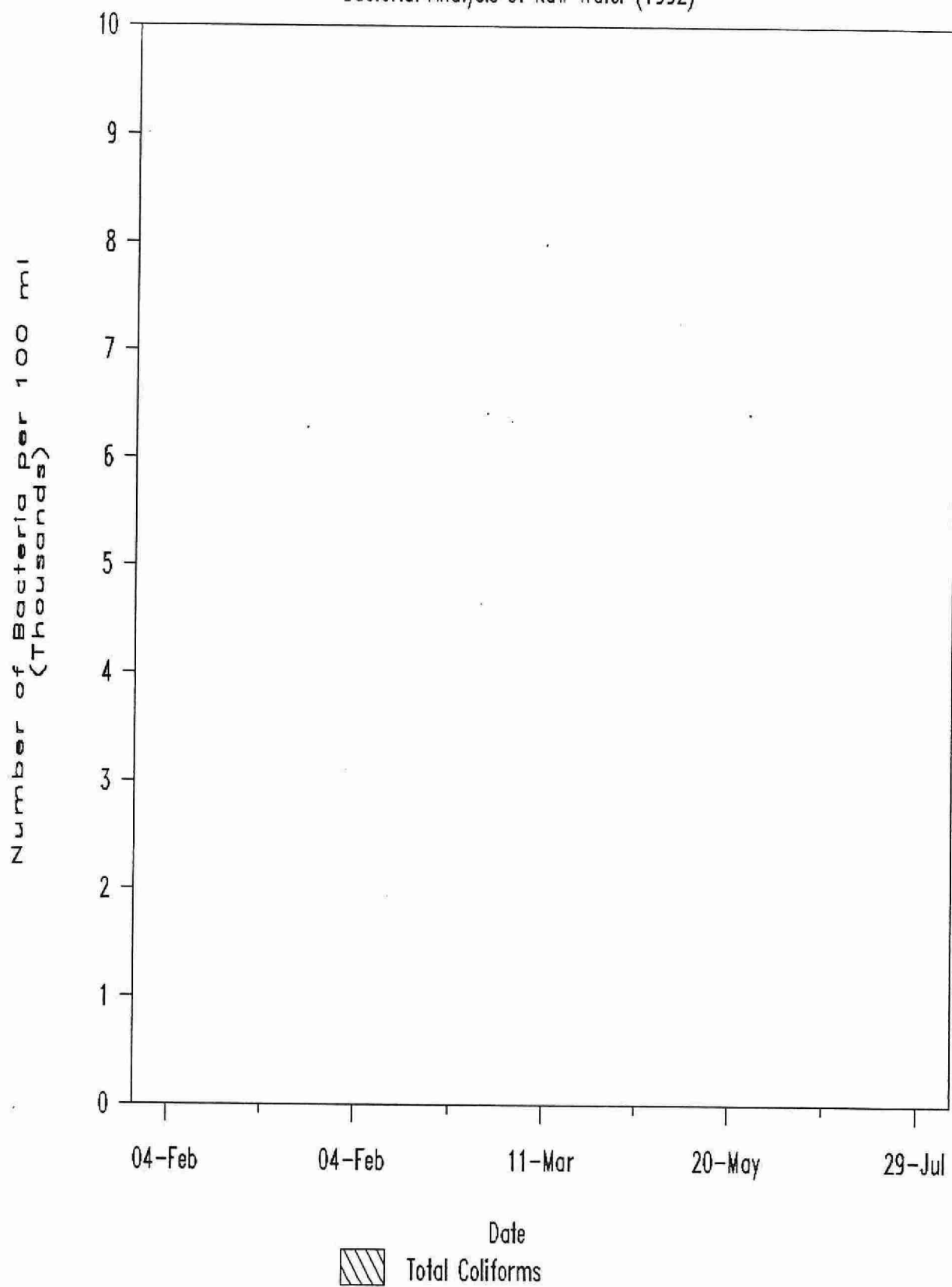
Bacterial Analysis of Raw Water (1992)



IROQUOIS

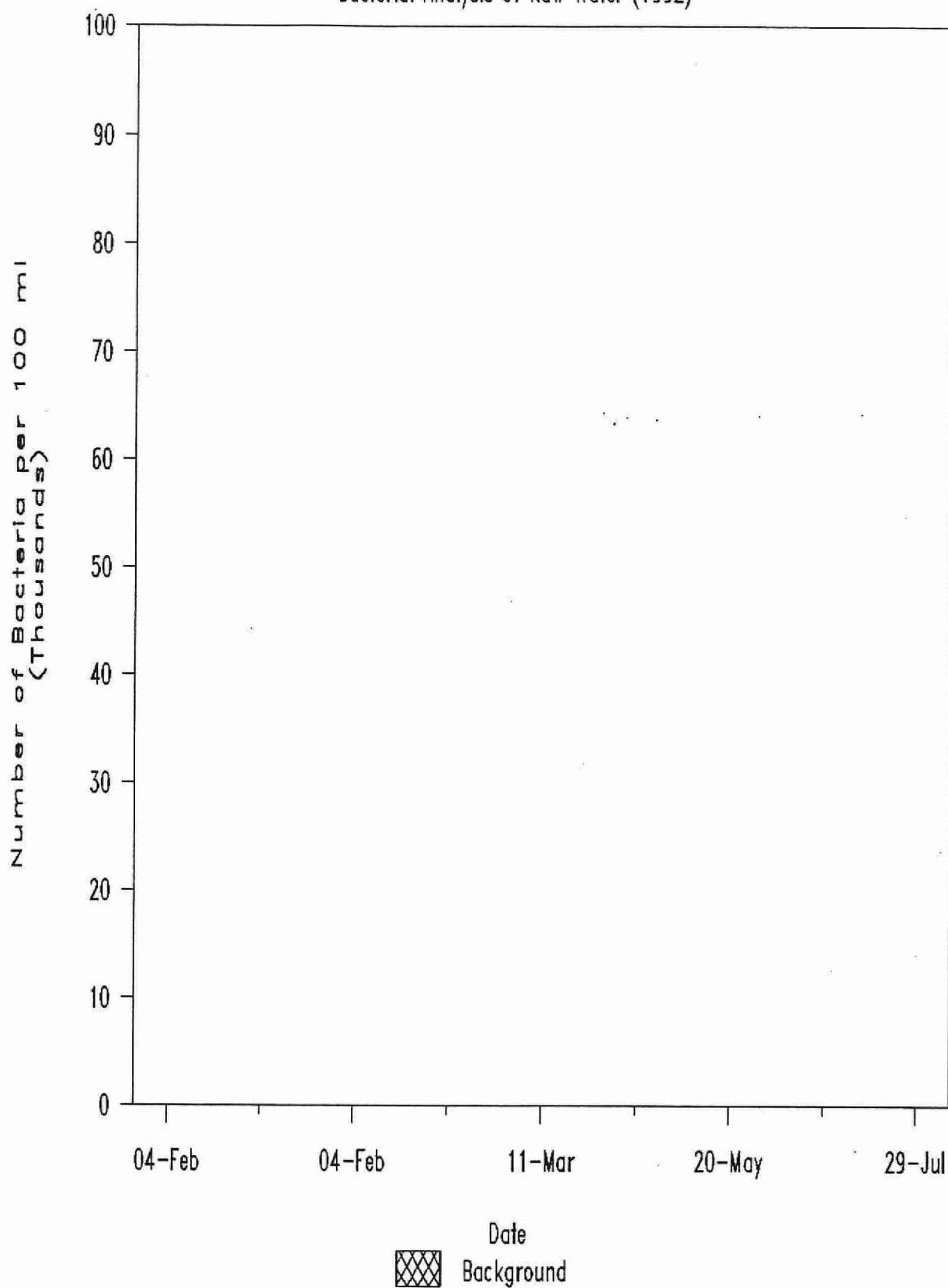
79

Bacterial Analysis of Raw Water (1992)



IROQUOIS

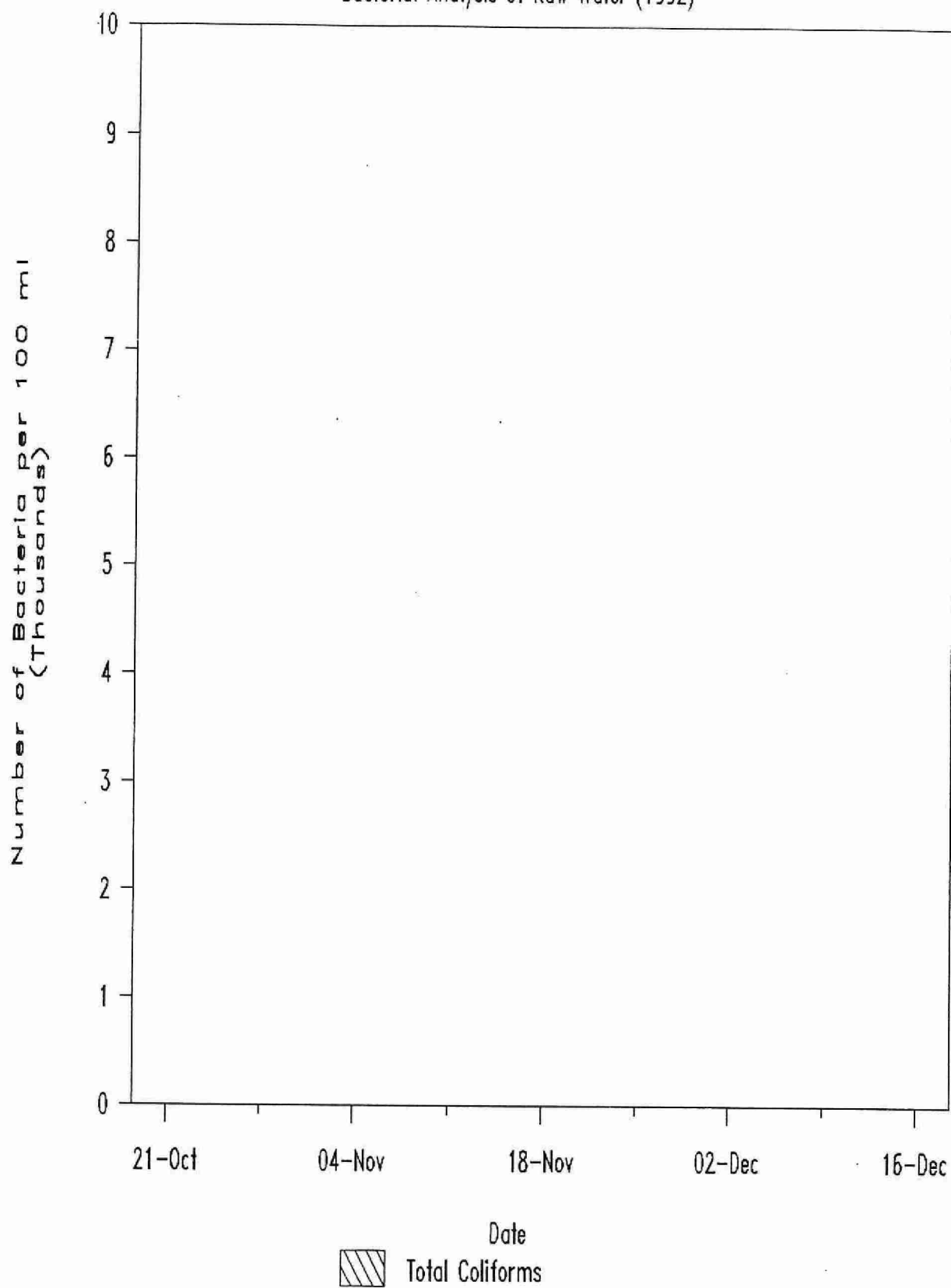
Bacterial Analysis of Raw Water (1992)



KEMPTVILLE

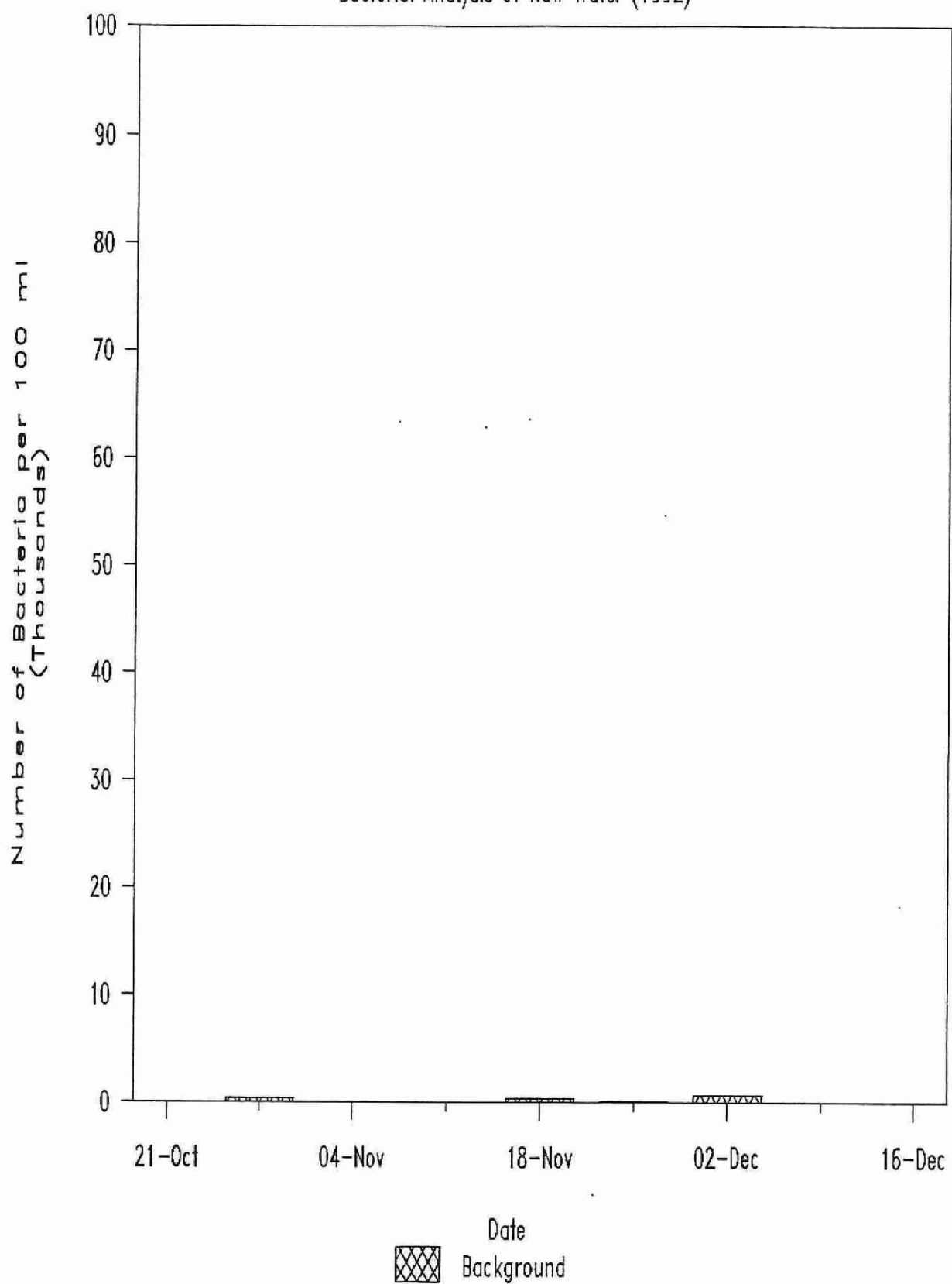
81

Bacterial Analysis of Raw Water (1992)



KEMPTVILLE

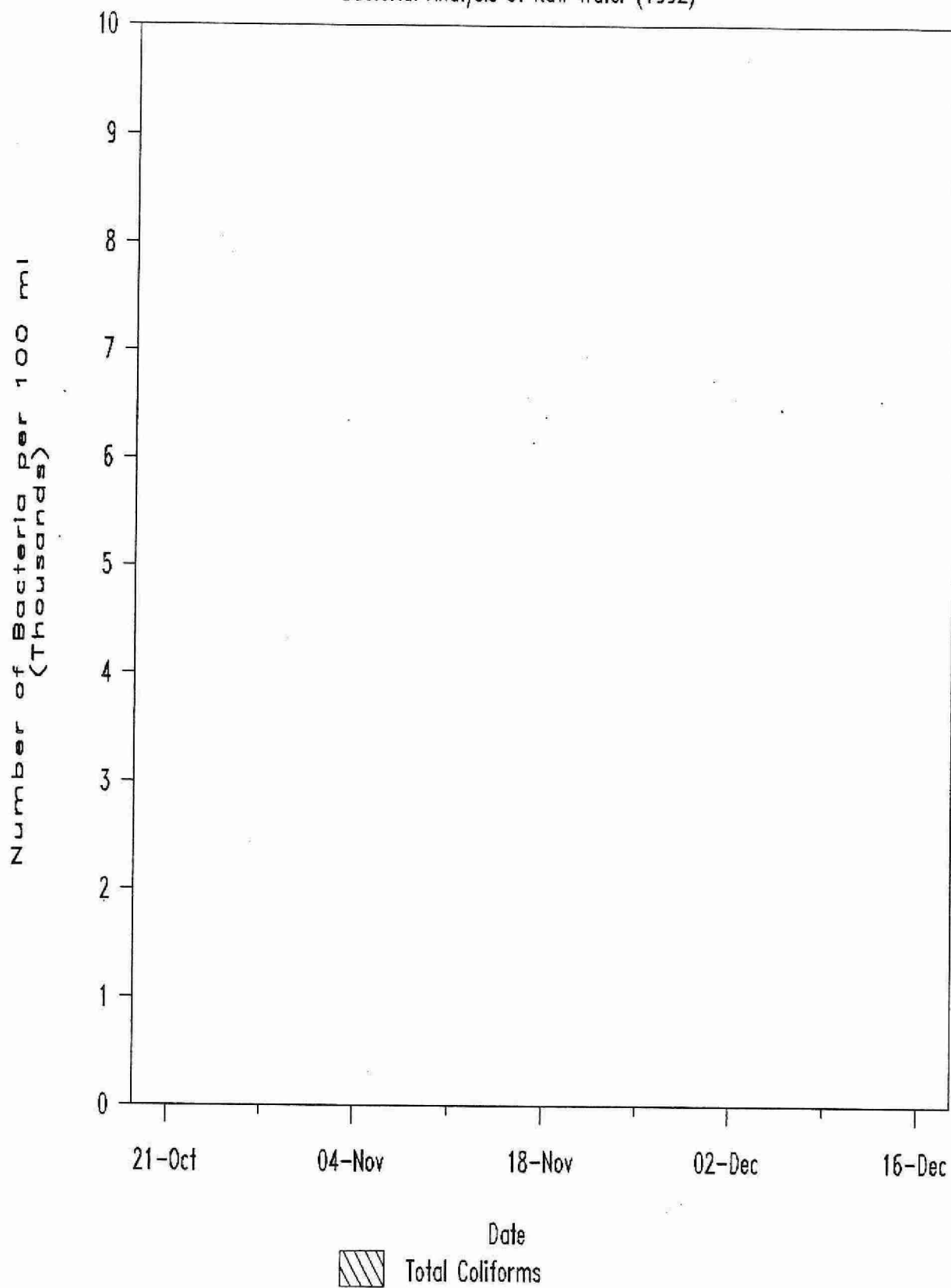
Bacterial Analysis of Raw Water (1992)



KILLALOE

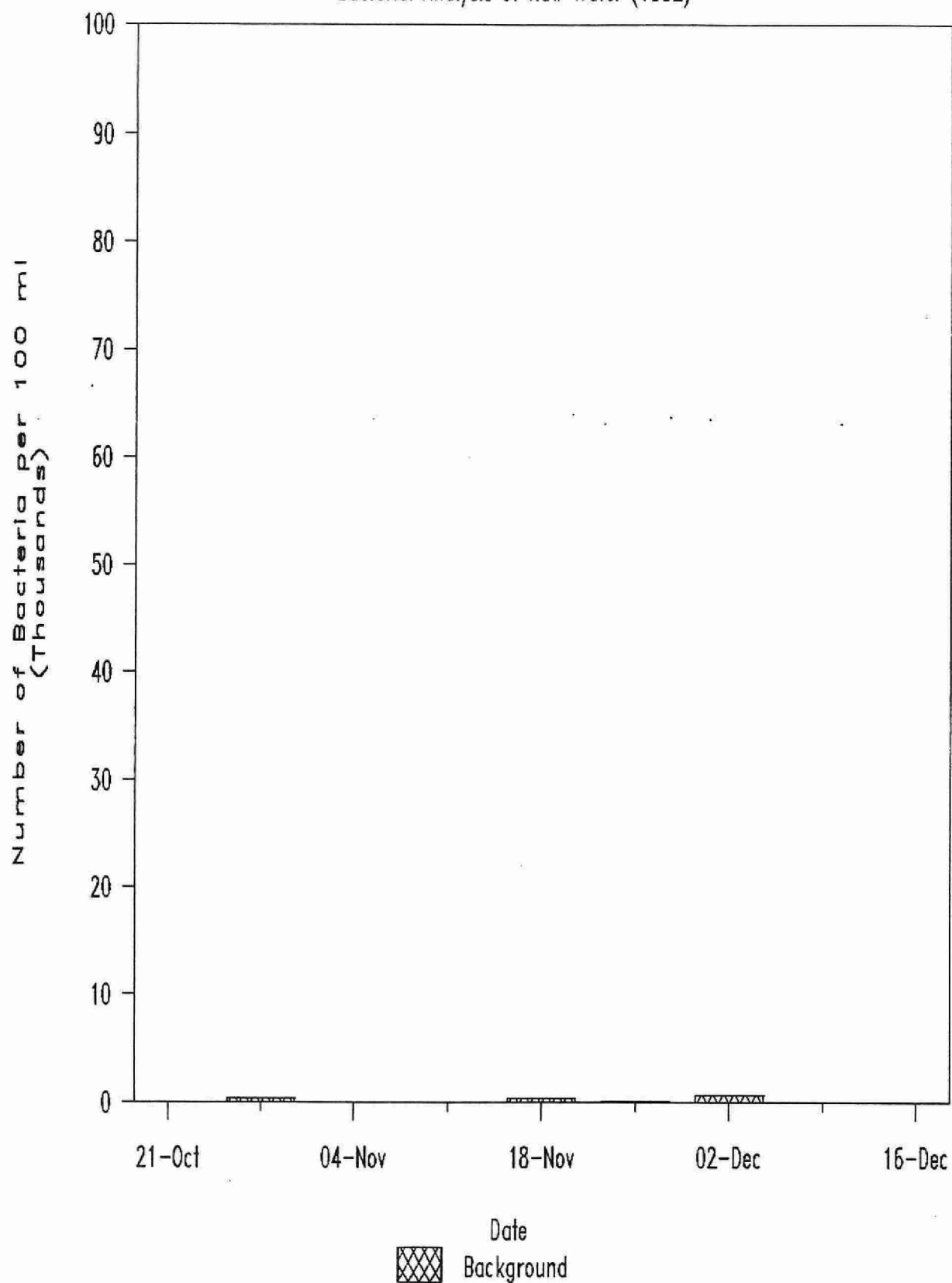
83

Bacterial Analysis of Raw Water (1992)



KILLALOE

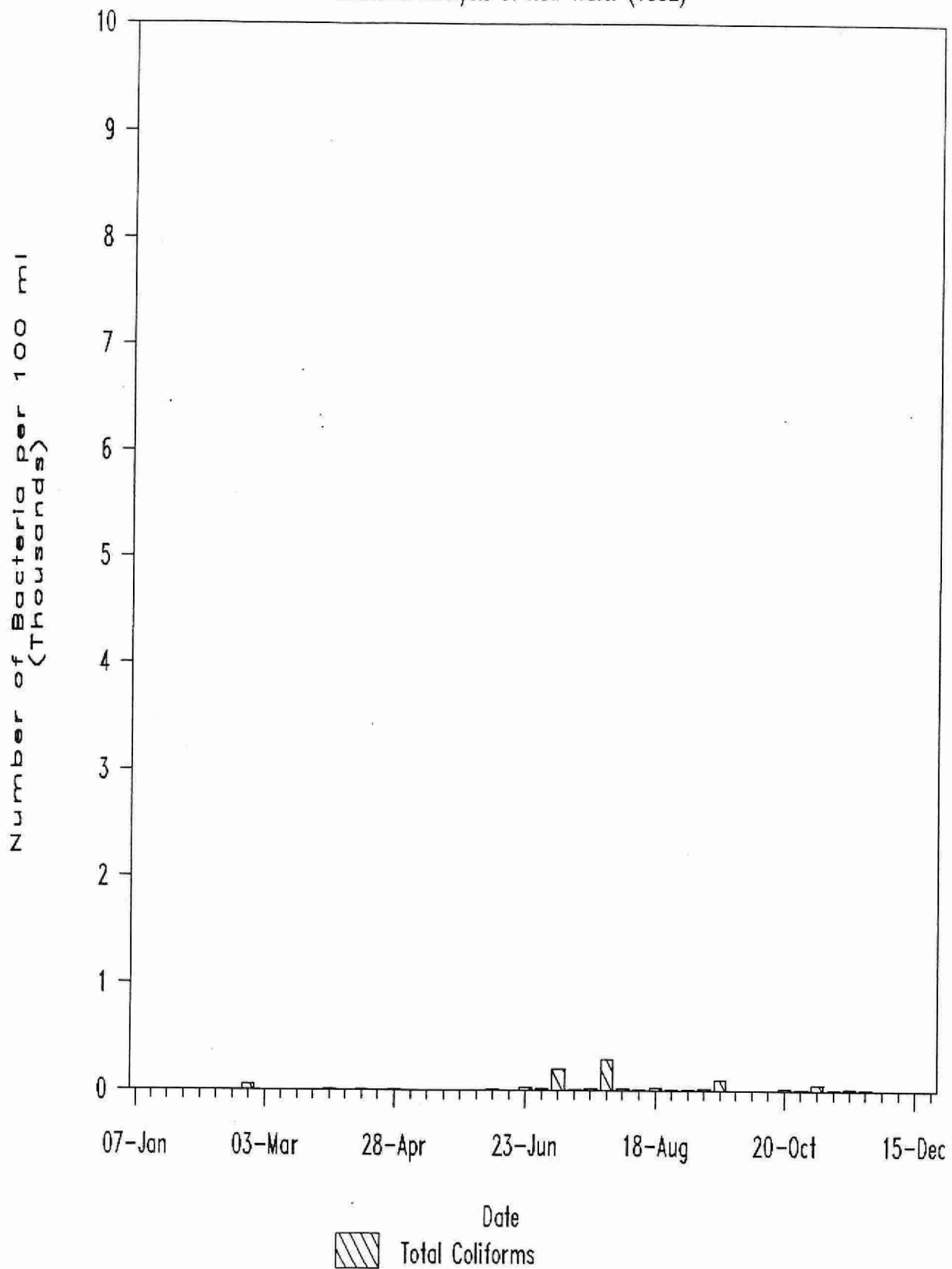
Bacterial Analysis of Raw Water (1992)



KINGSTON

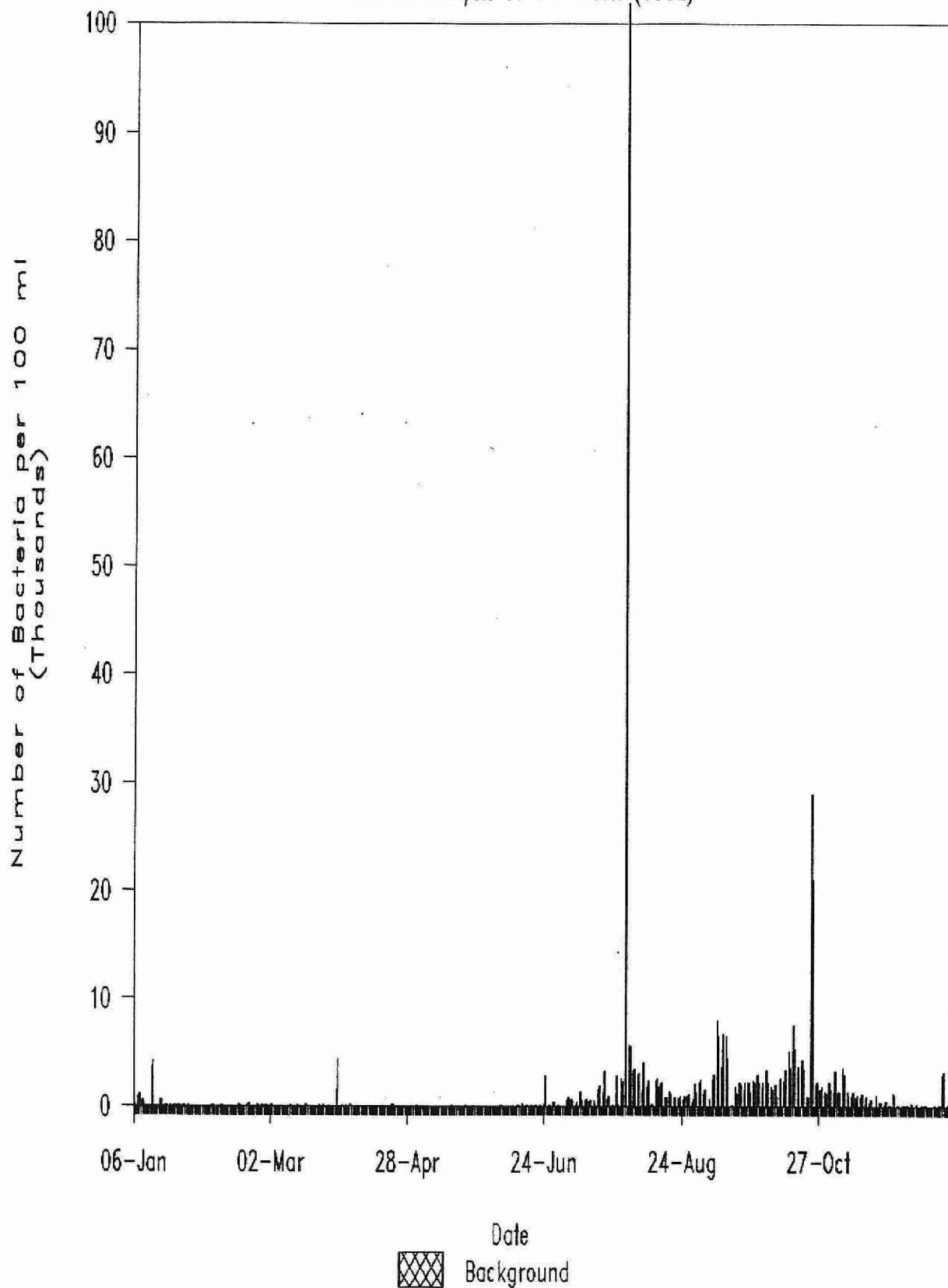
85

Bacterial Analysis of Raw Water (1992)



KINGSTON (CITY)

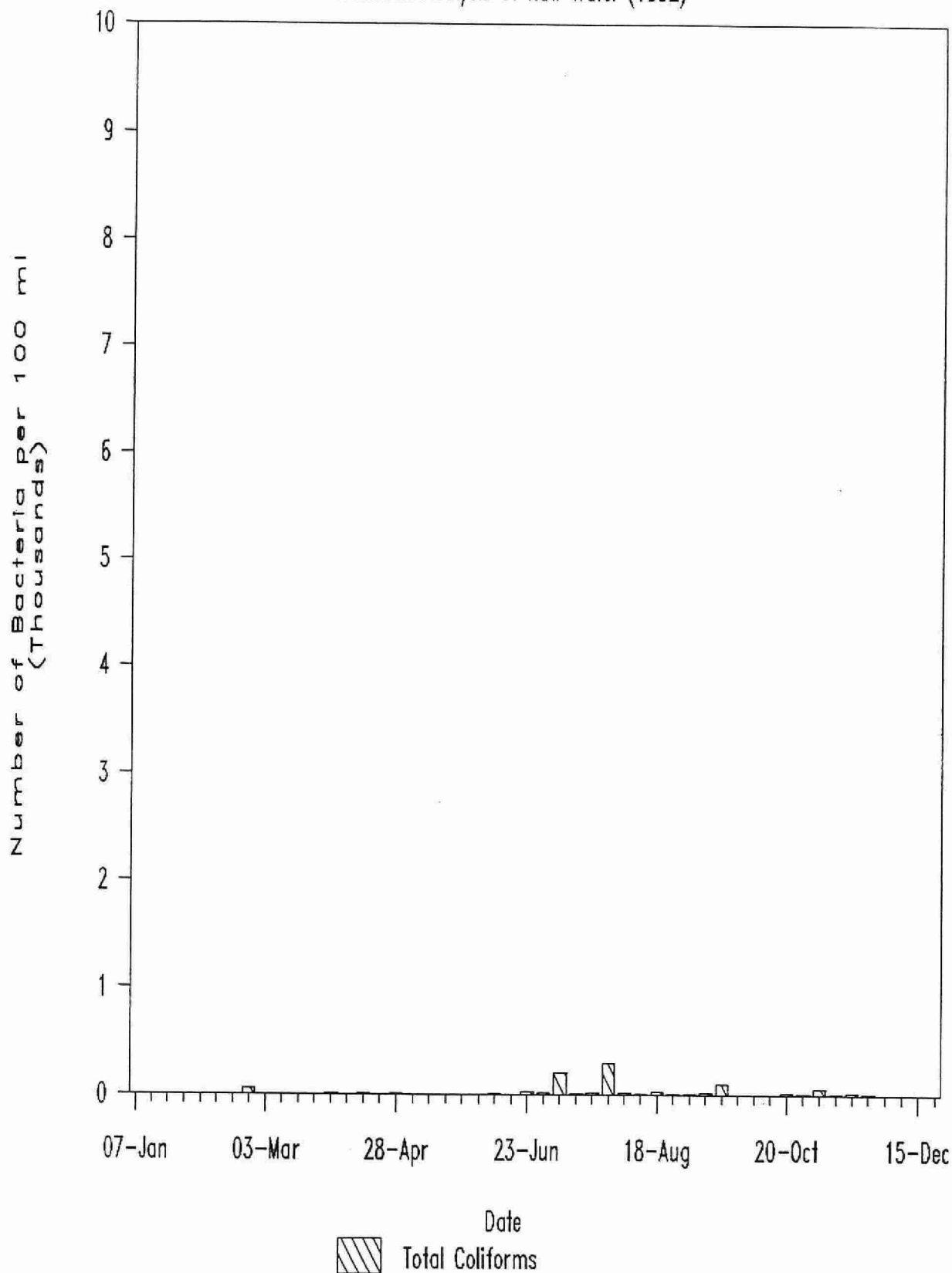
Bacterial Analysis of Raw Water (1992)



KINGSTON TWP (DUPONT)

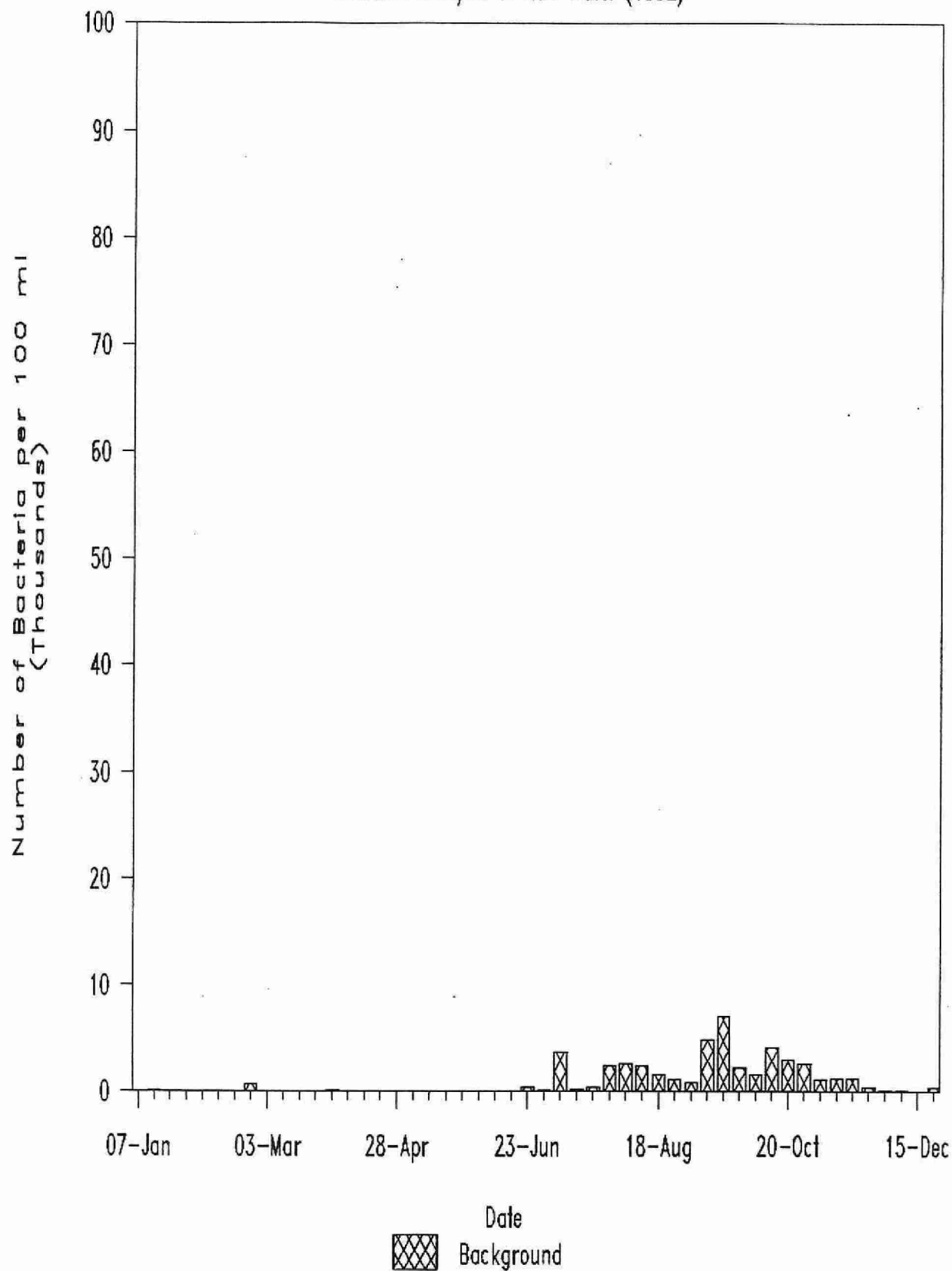
87

Bacterial Analysis of Raw Water (1992)



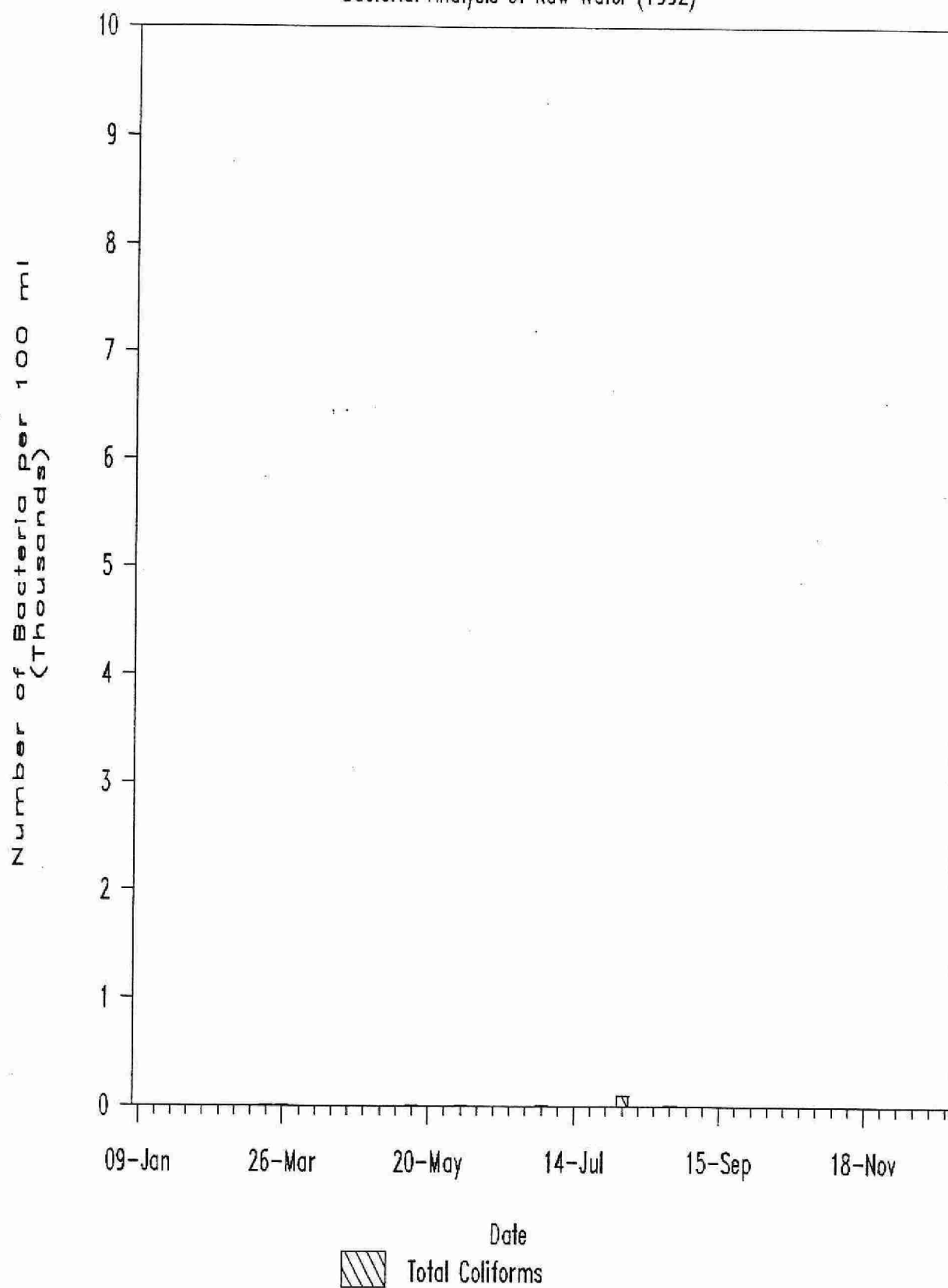
KINGSTON TWP (DUPONT)

Bacterial Analysis of Raw Water (1992)



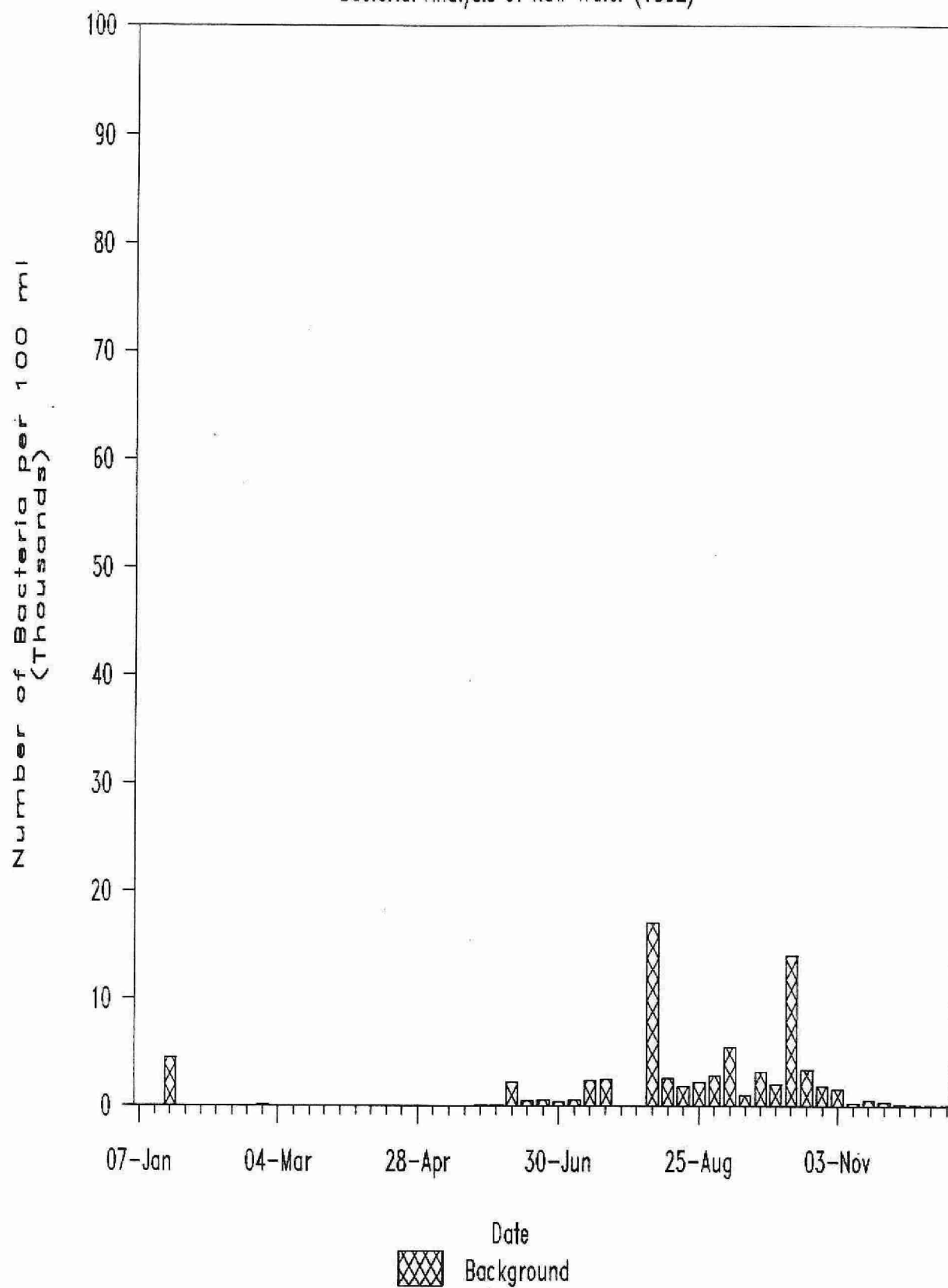
KINGSTON TWP (WTP)

Bacterial Analysis of Raw Water (1992)



KINGSTON TWP (WTP)

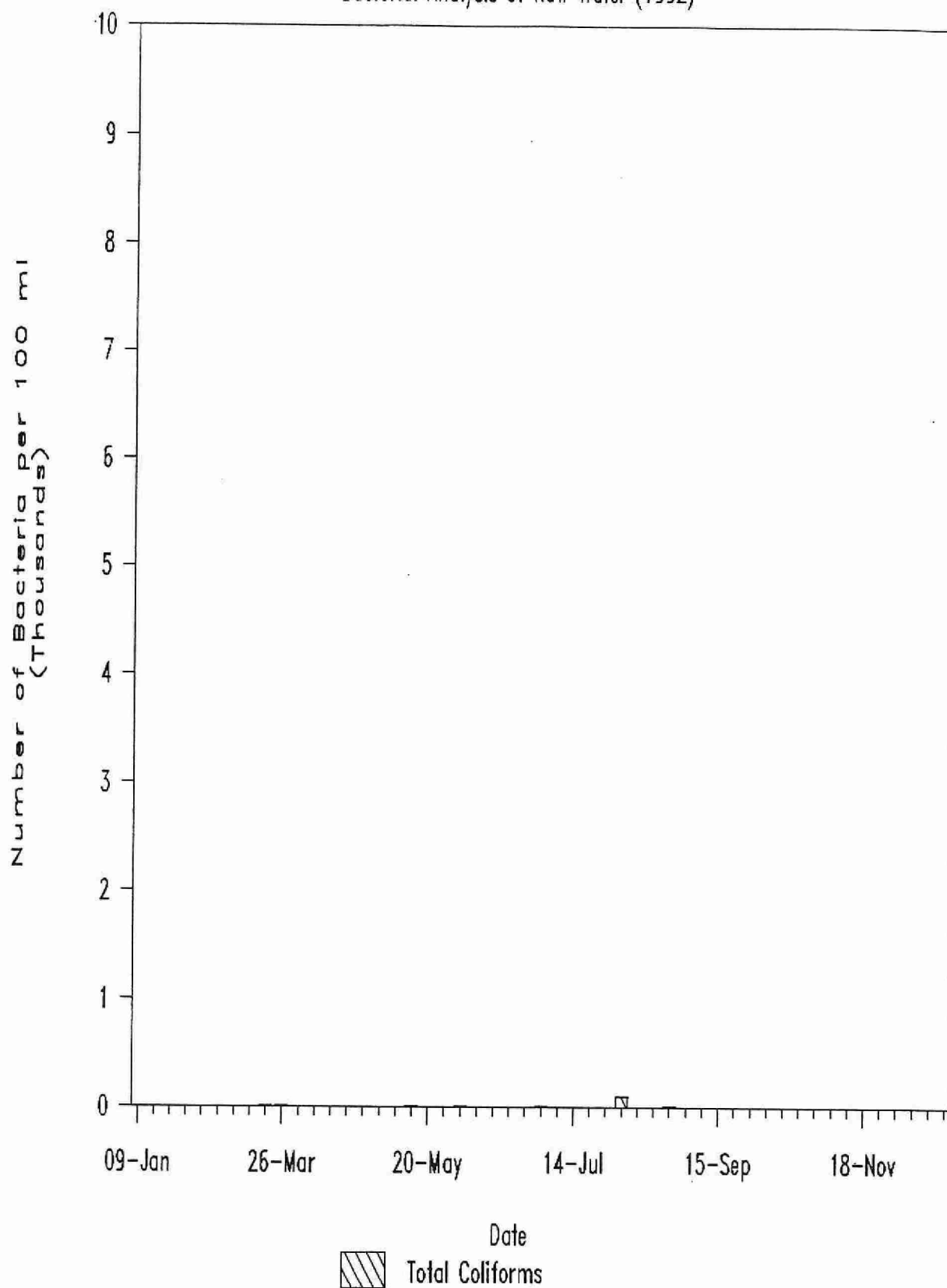
Bacterial Analysis of Raw Water (1992)



LANCASTER

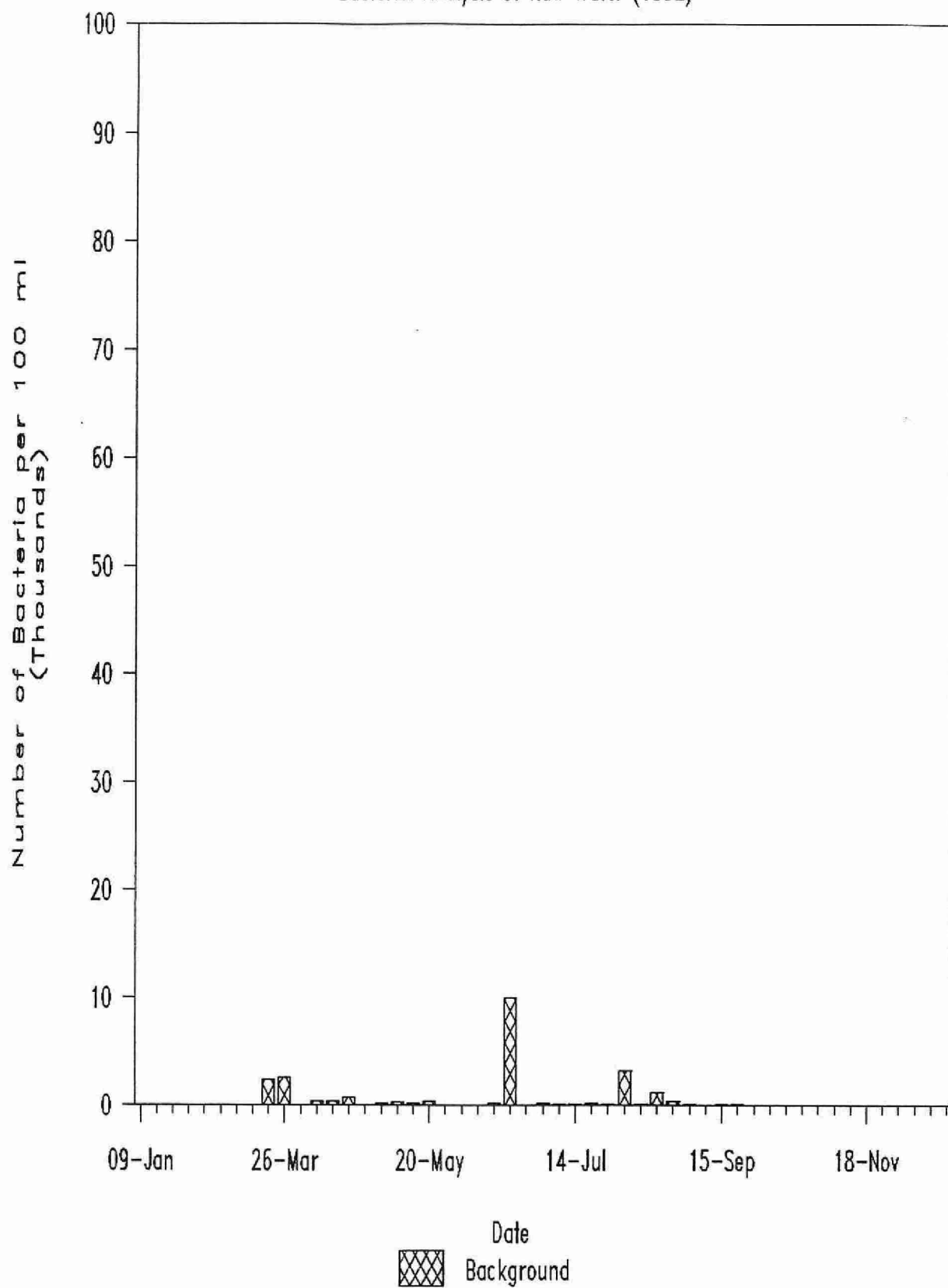
91

Bacterial Analysis of Raw Water (1992)



LANCASTER

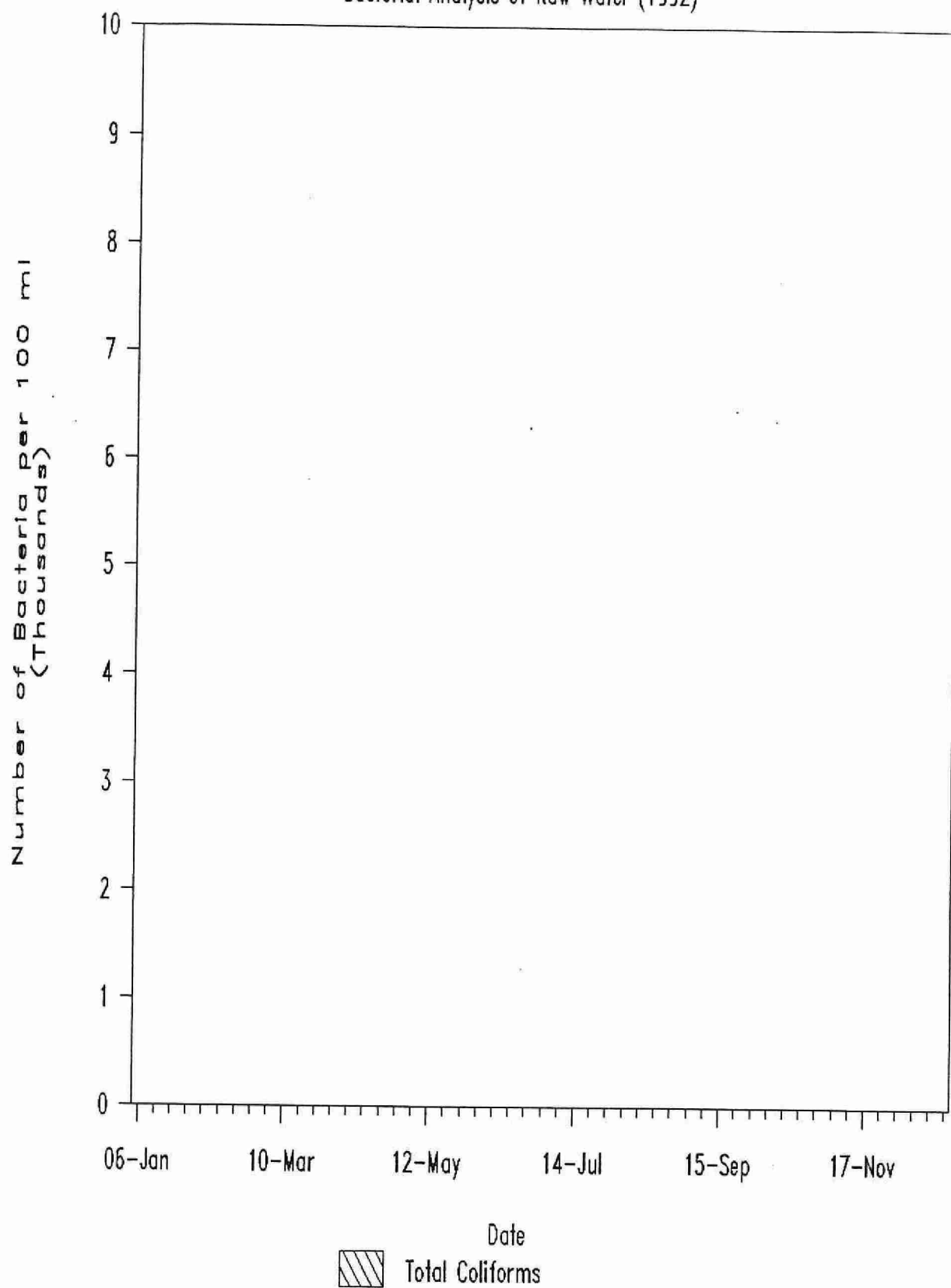
Bacterial Analysis of Raw Water (1992)



LANCASTER (CREG QUAY)

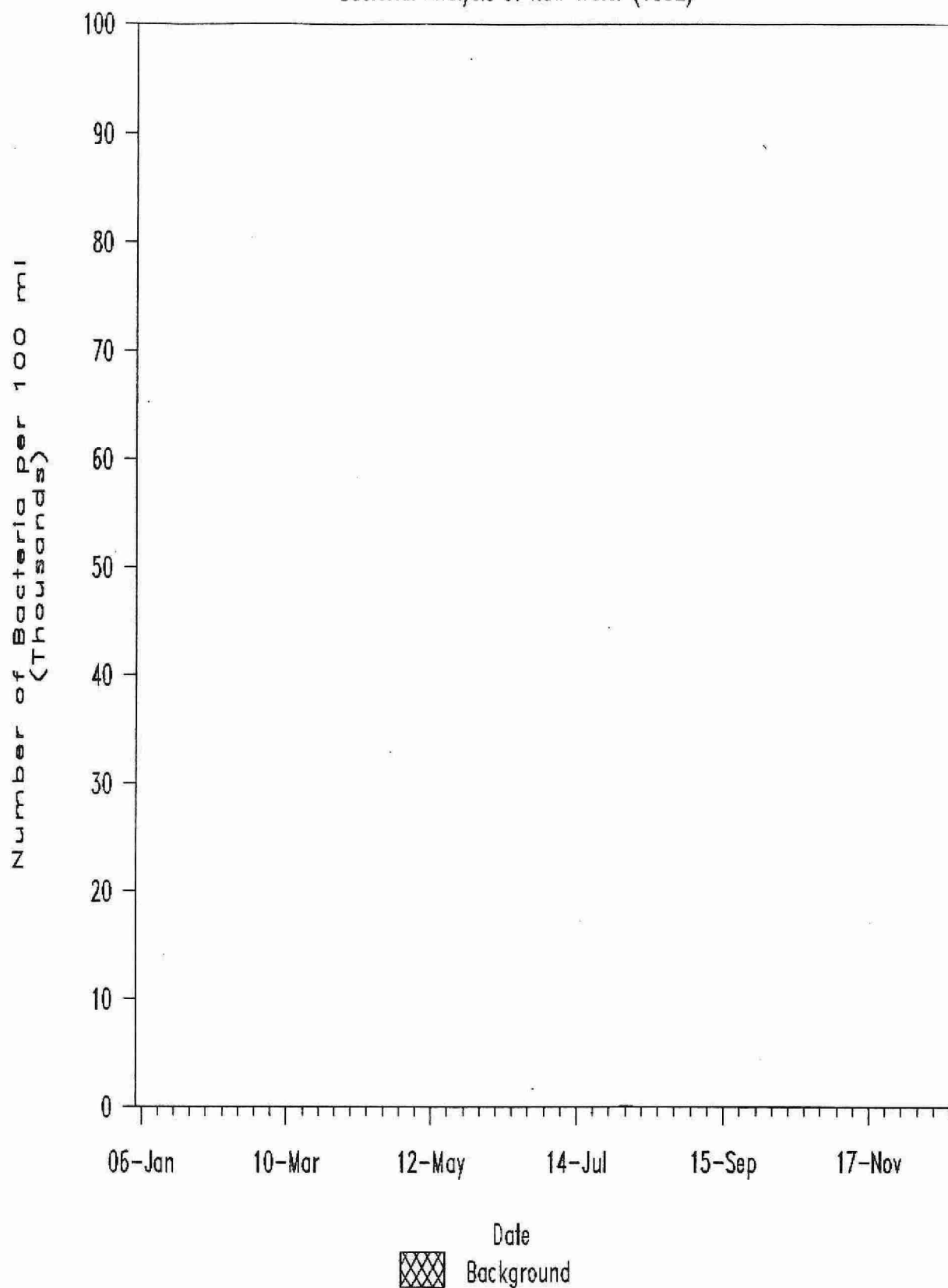
93

Bacterial Analysis of Raw Water (1992)



LANCASTER (CREG QUAY)

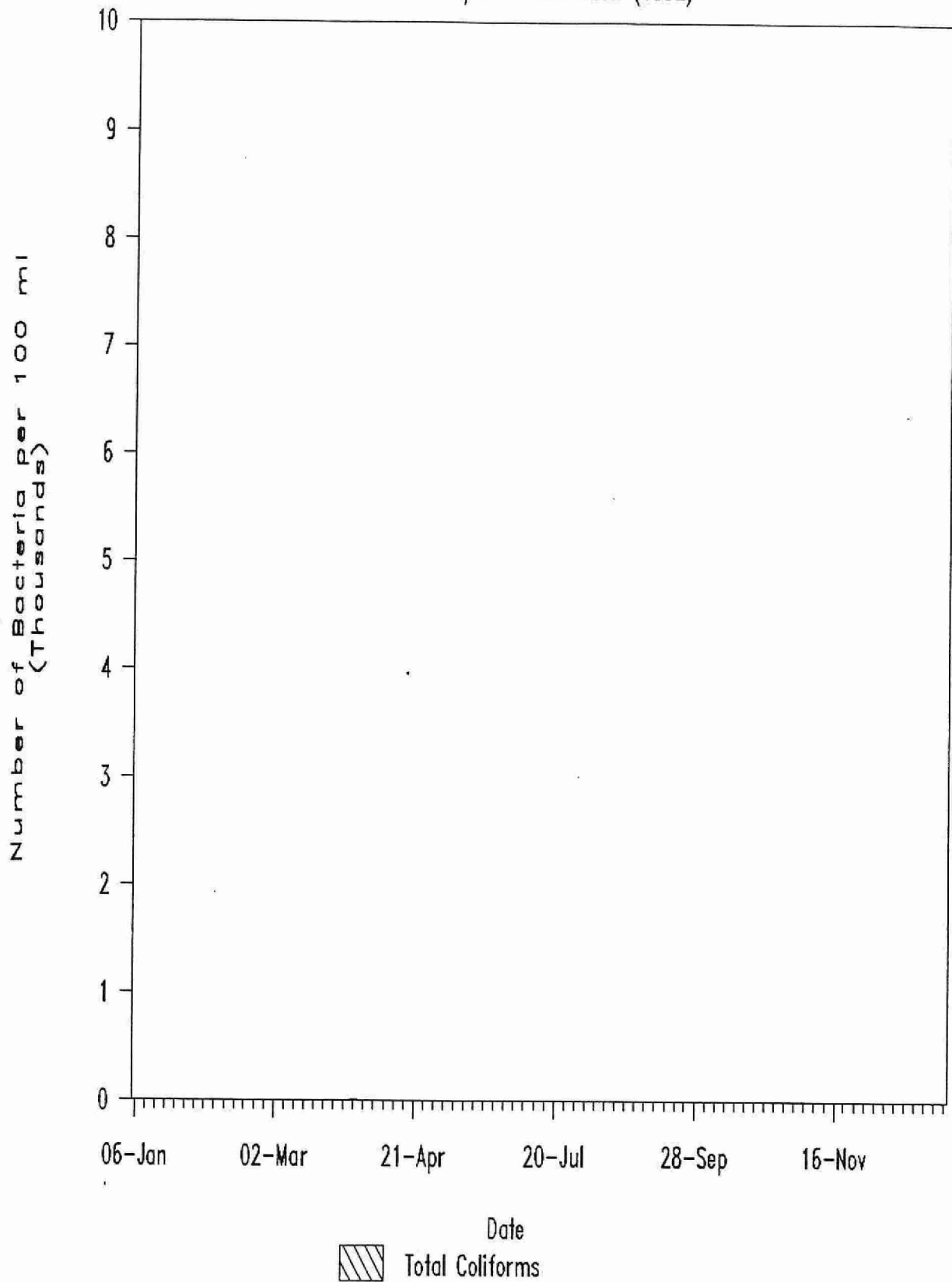
Bacterial Analysis of Raw Water (1992)



LANSDOWNE

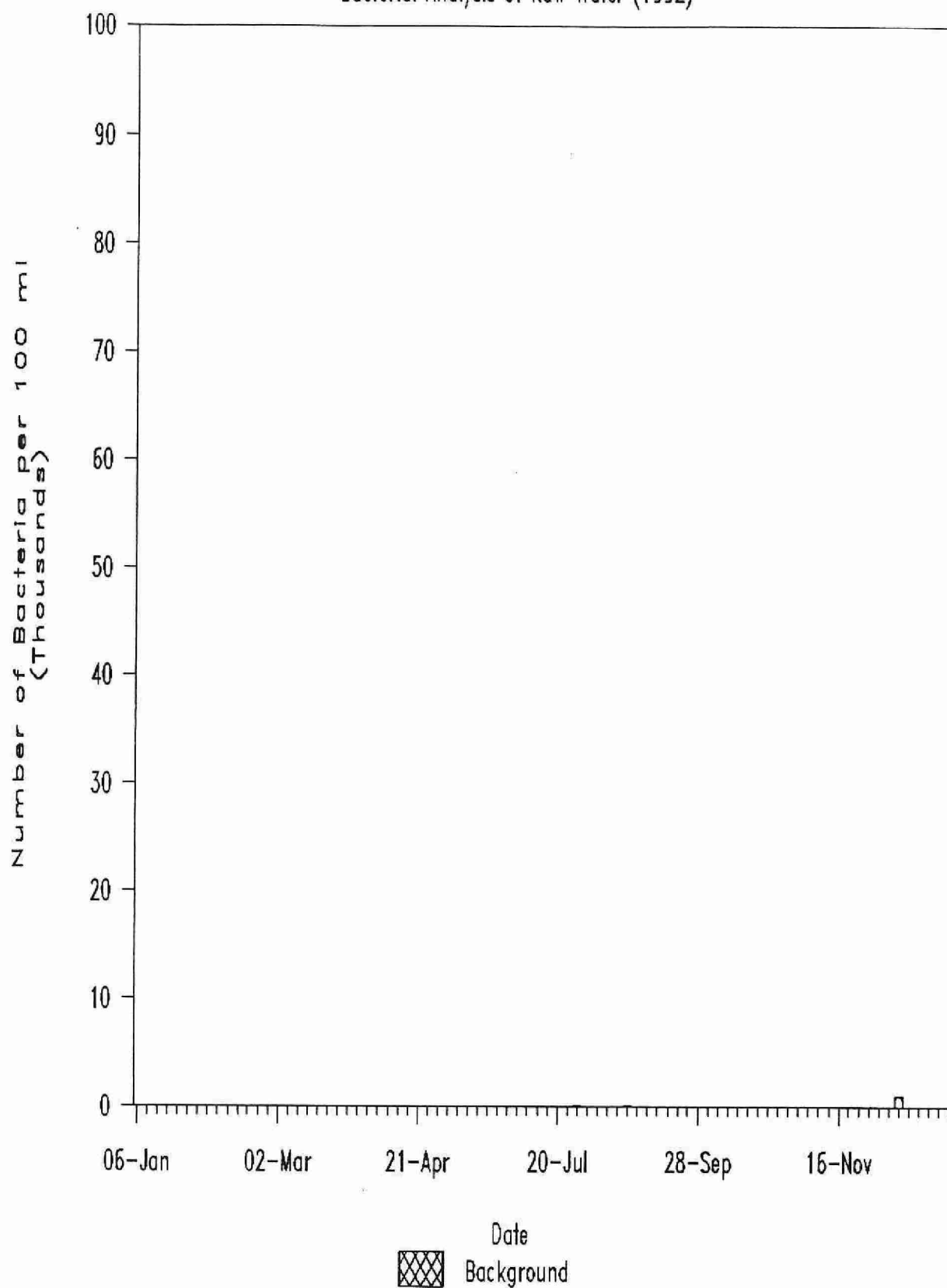
95

Bacterial Analysis of Raw Water (1992)



LANSDOWNE

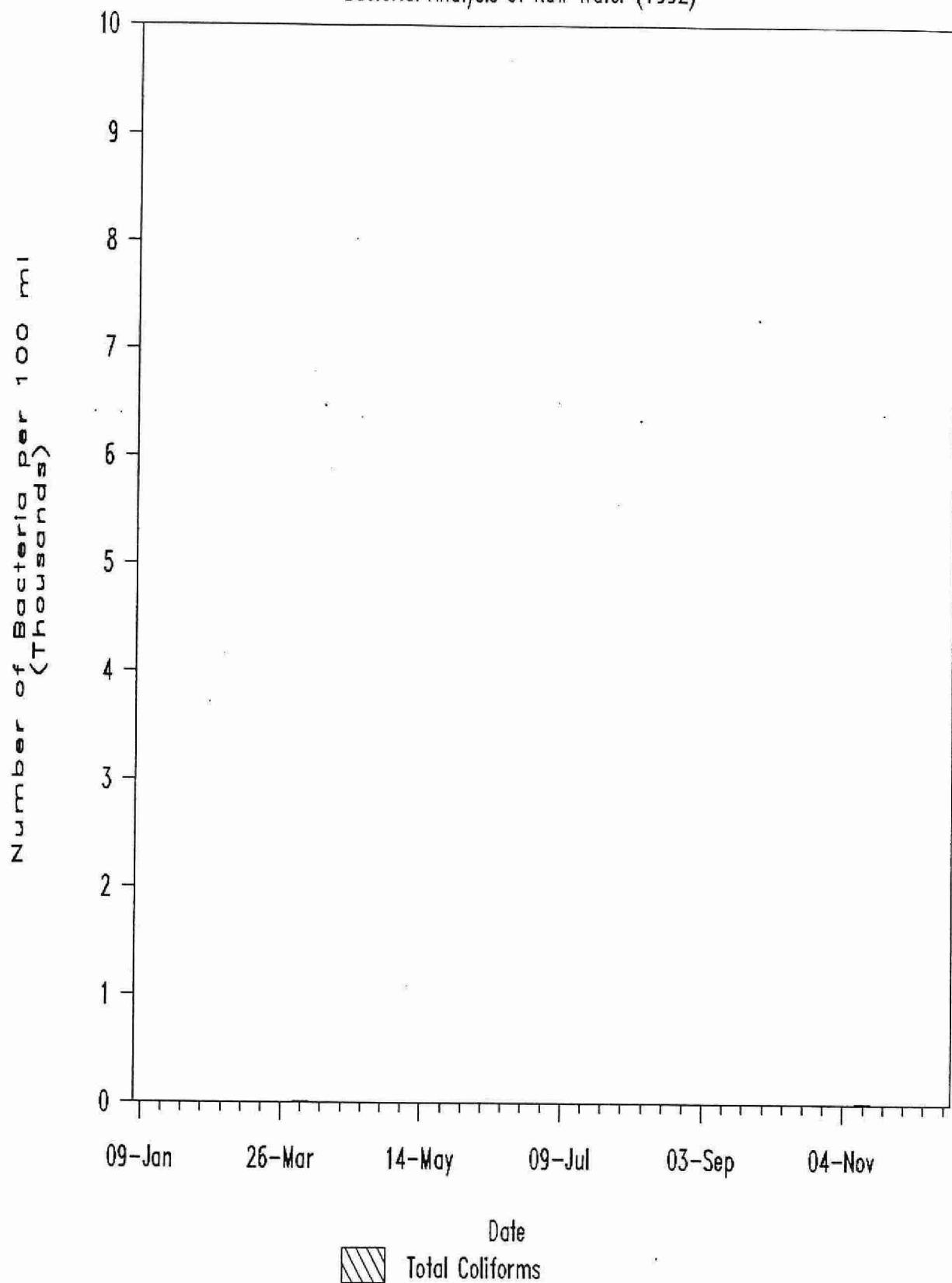
Bacterial Analysis of Raw Water (1992)



LOCHIEL TWP (GLEN ROBERTSON)

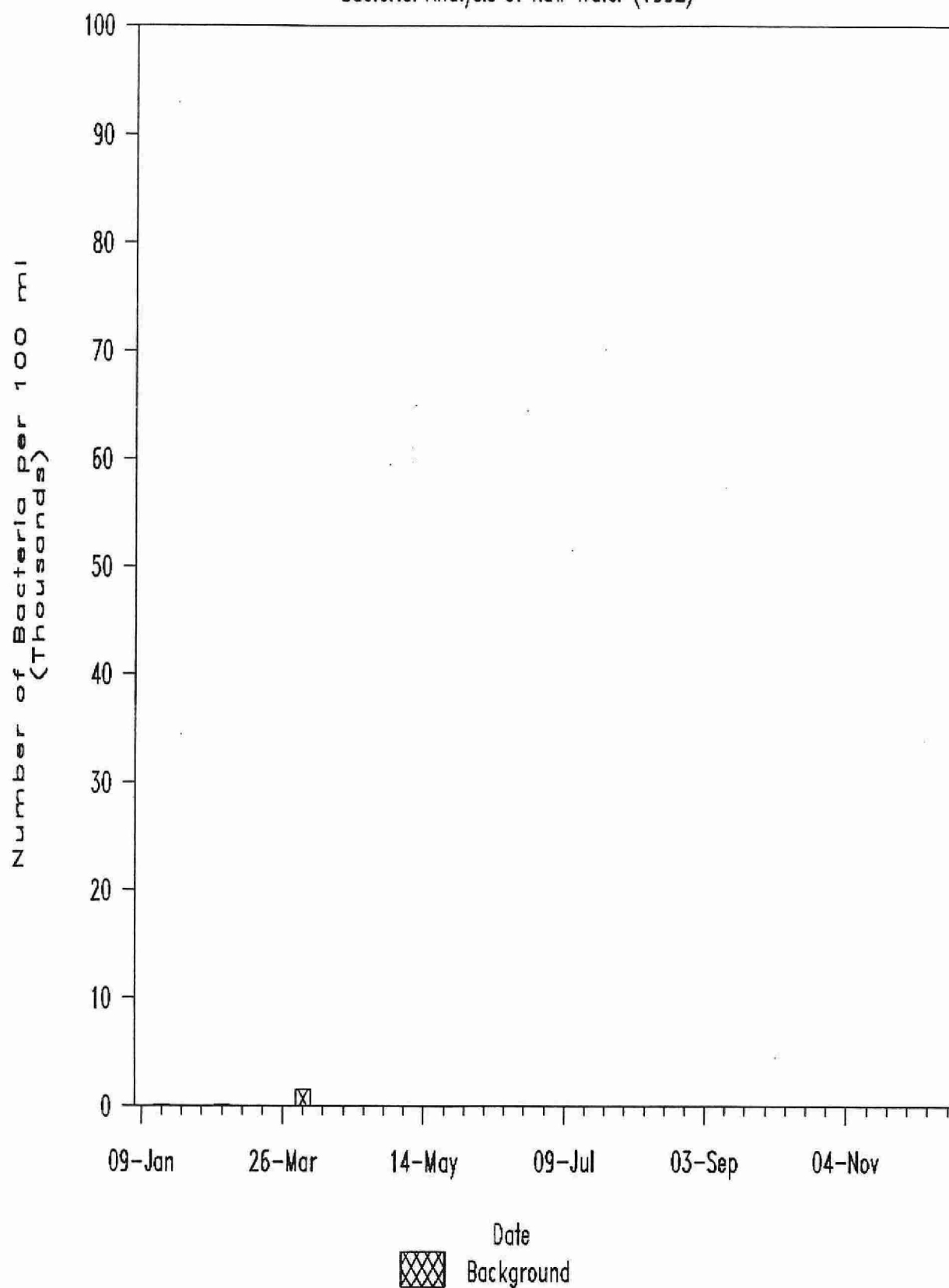
97

Bacterial Analysis of Raw Water (1992)



LOCHIEL TWP (GLEN ROBERTSON)

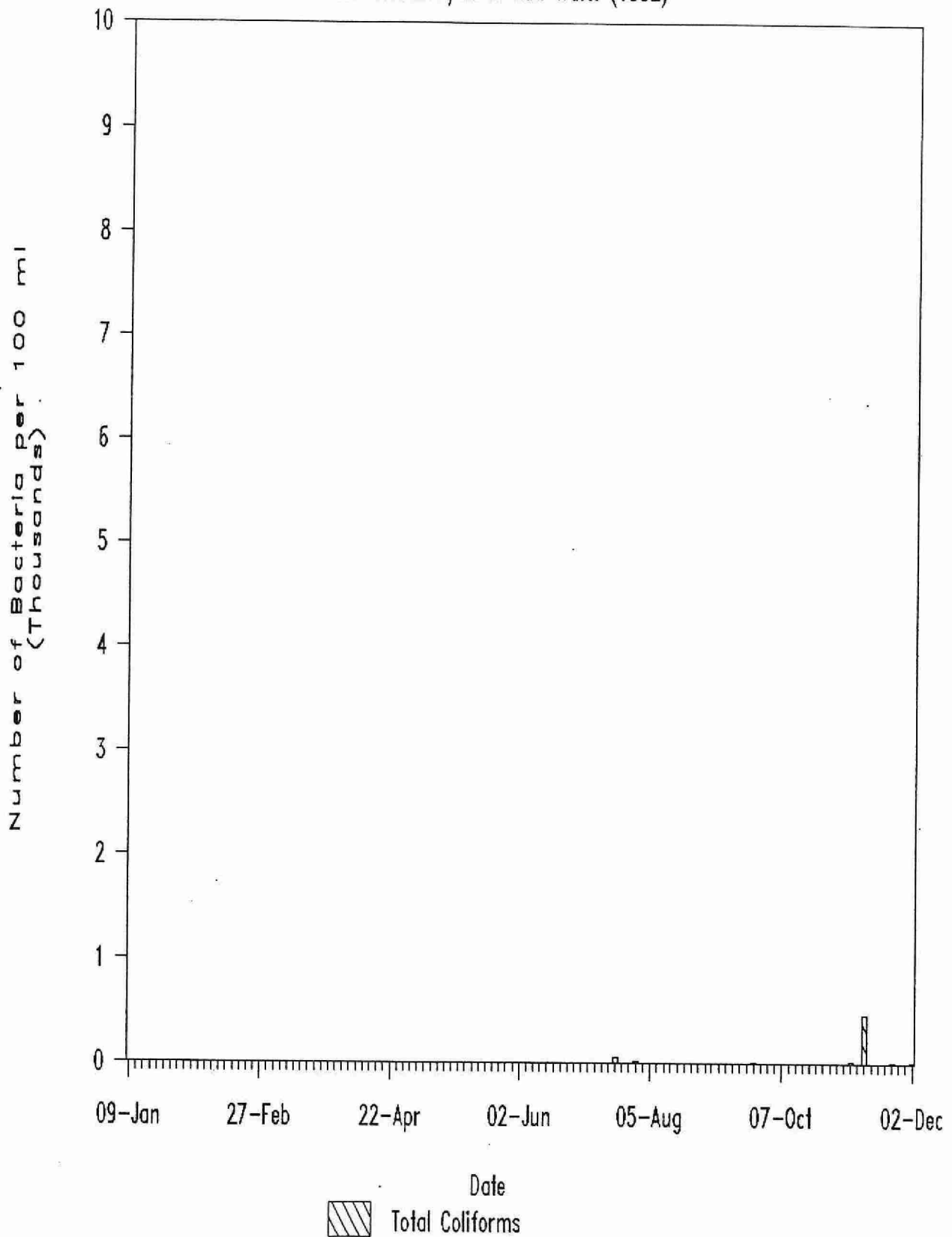
Bacterial Analysis of Raw Water (1992)



LORIGNAL

99

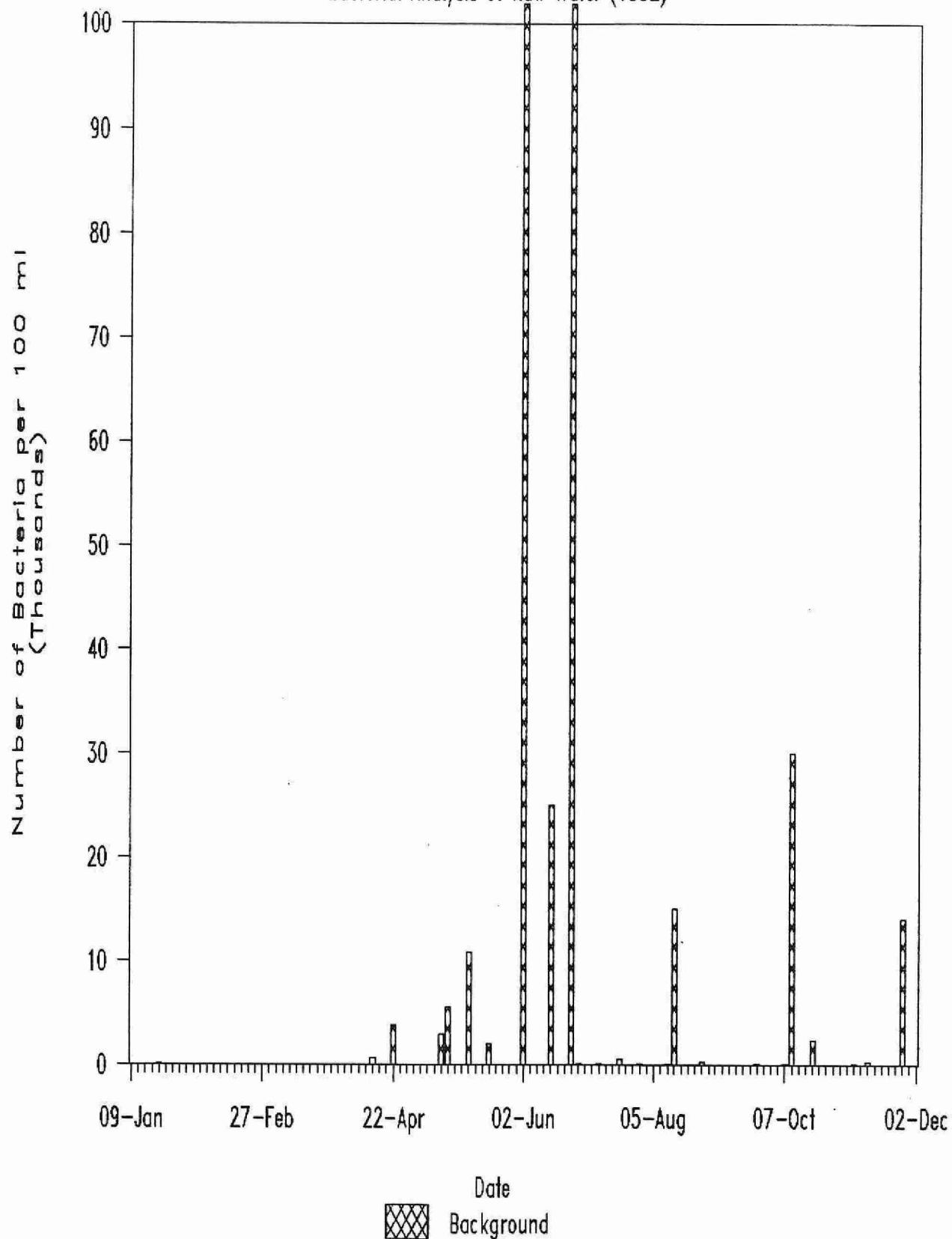
Bacterial Analysis of Raw Water (1992)



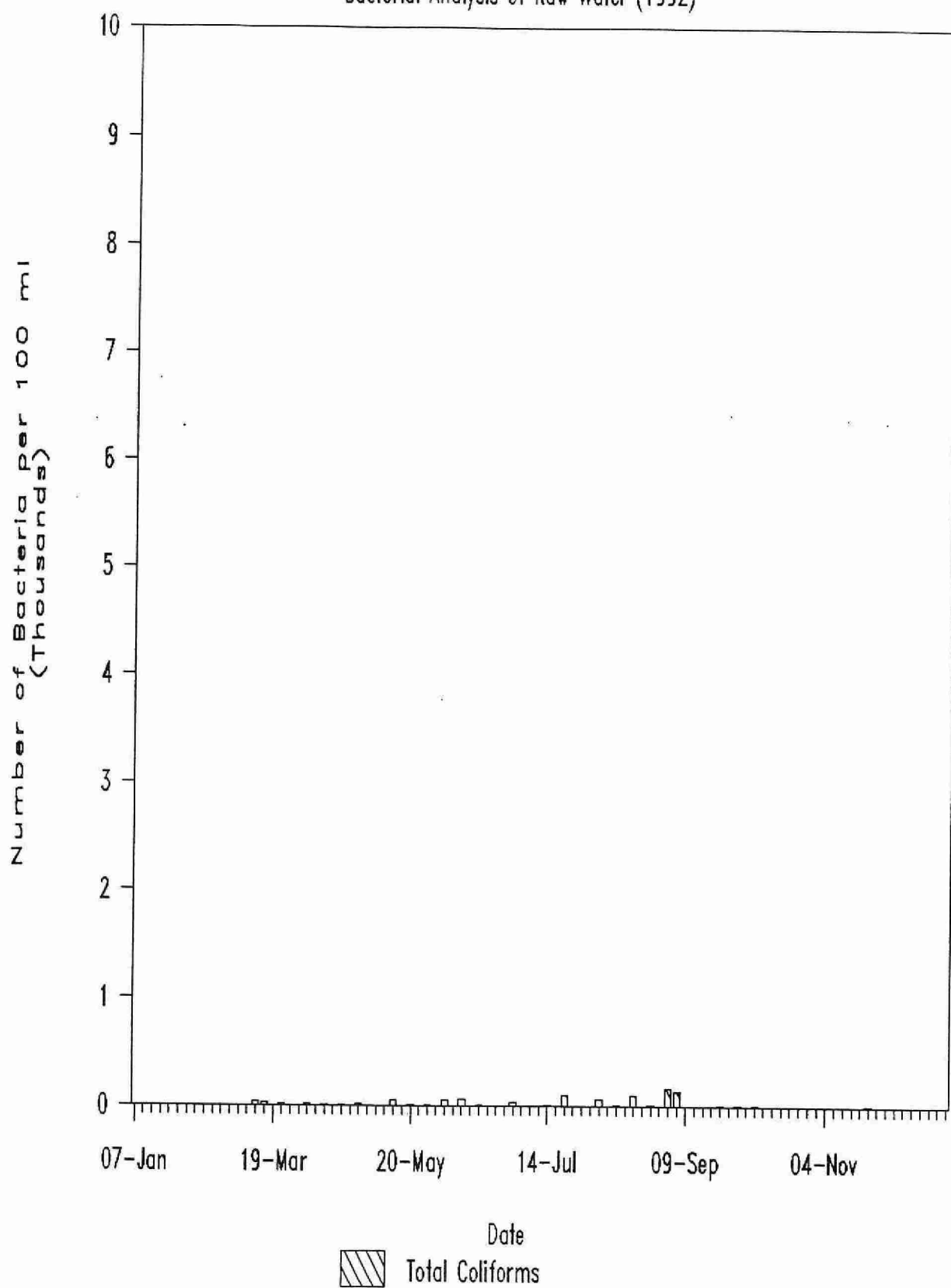
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LORIGNAL

Bacterial Analysis of Raw Water (1992)

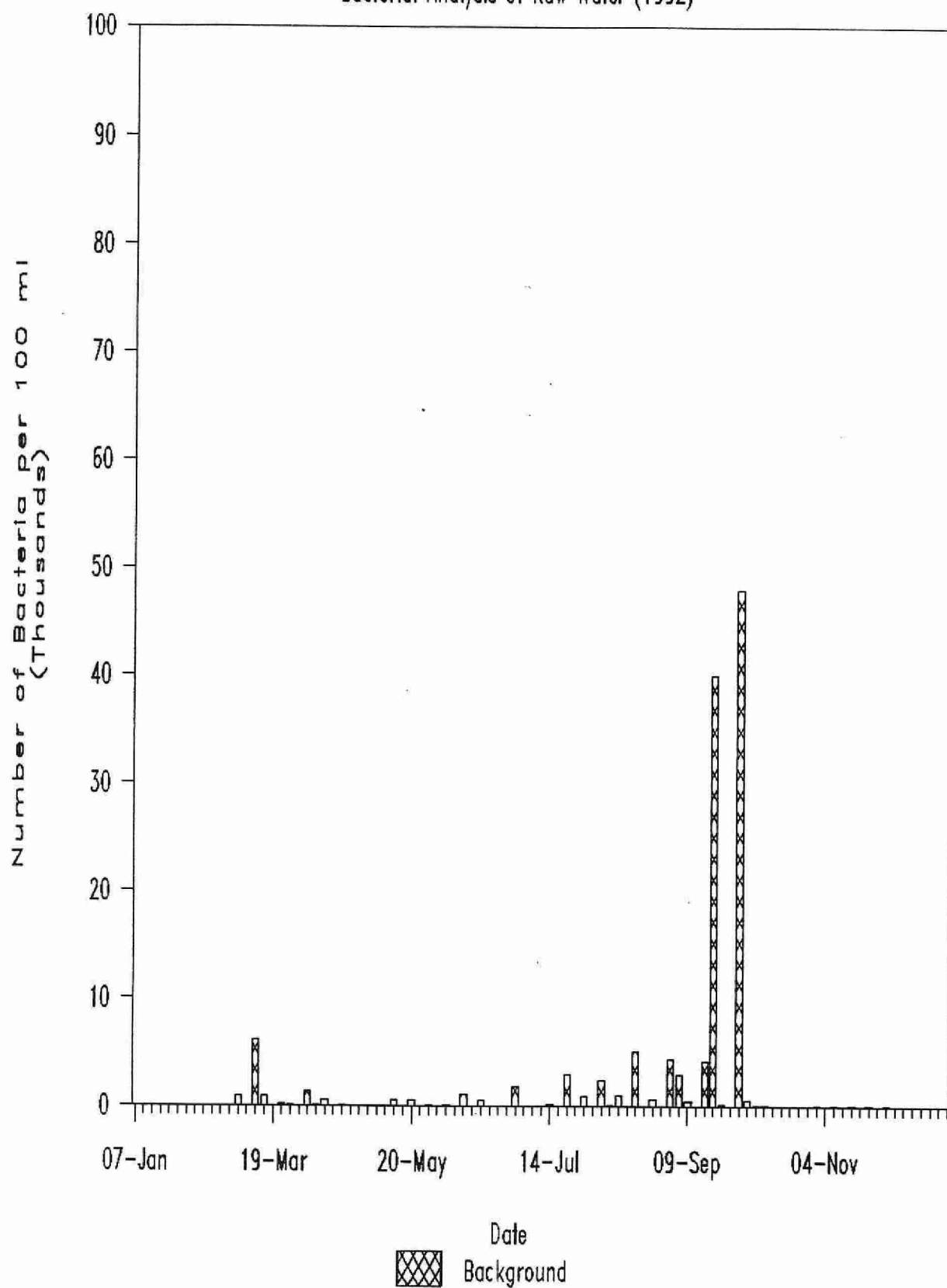


Bacterial Analysis of Raw Water (1992)



MADOC

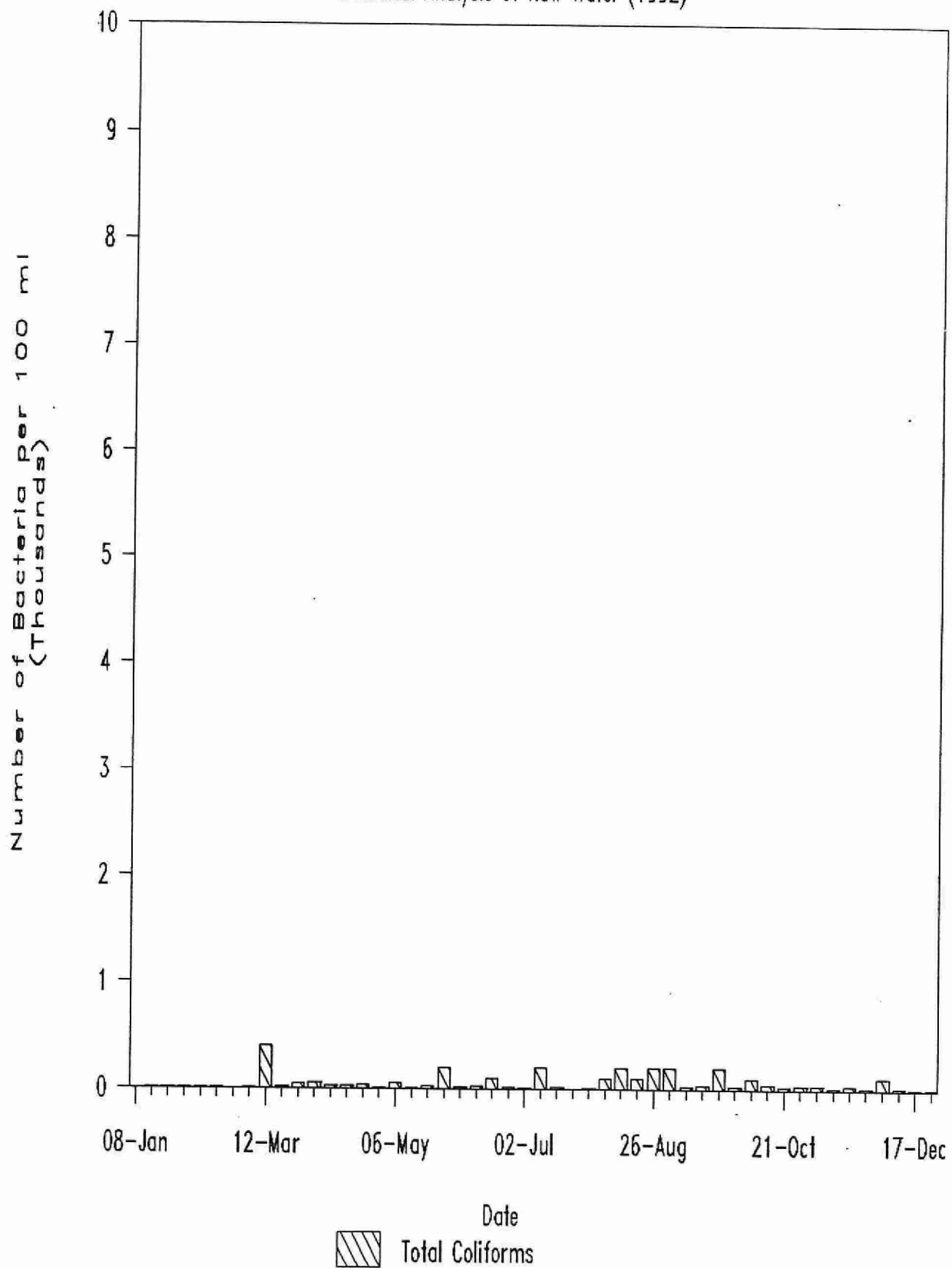
Bacterial Analysis of Raw Water (1992)



MARMORA

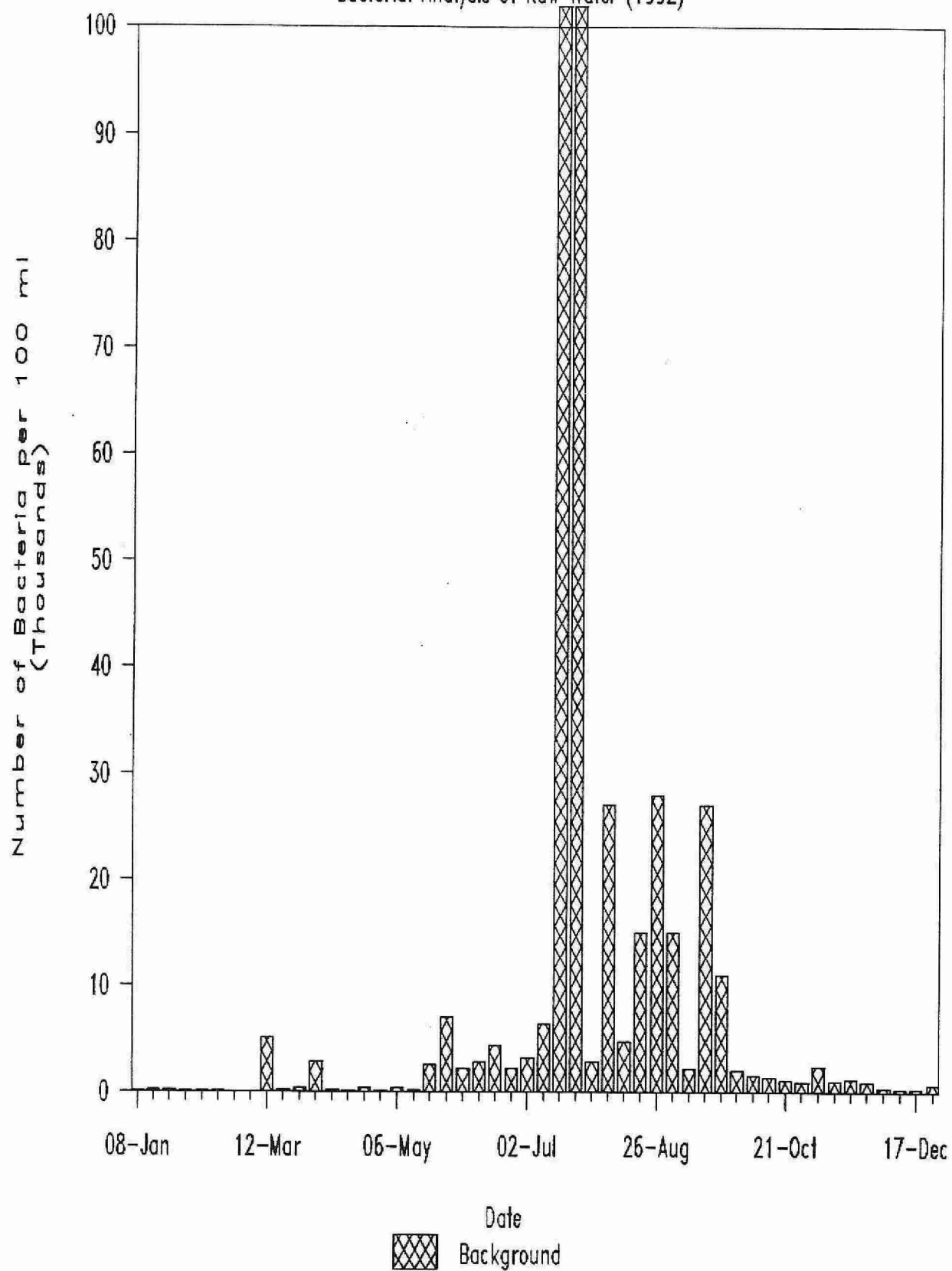
103

Bacterial Analysis of Raw Water (1992)



MARMORA

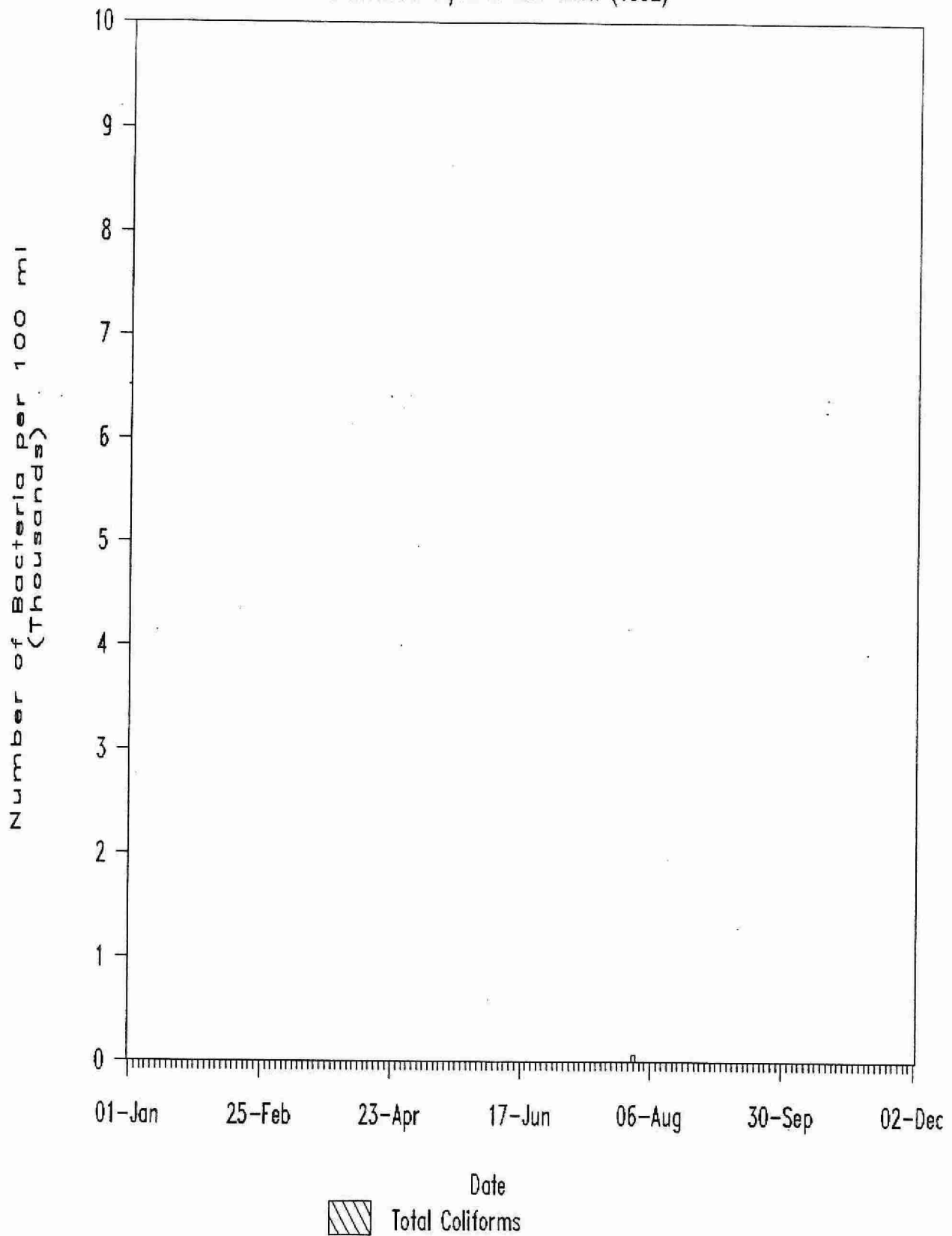
Bacterial Analysis of Raw Water (1992)



MERRICKVILLE

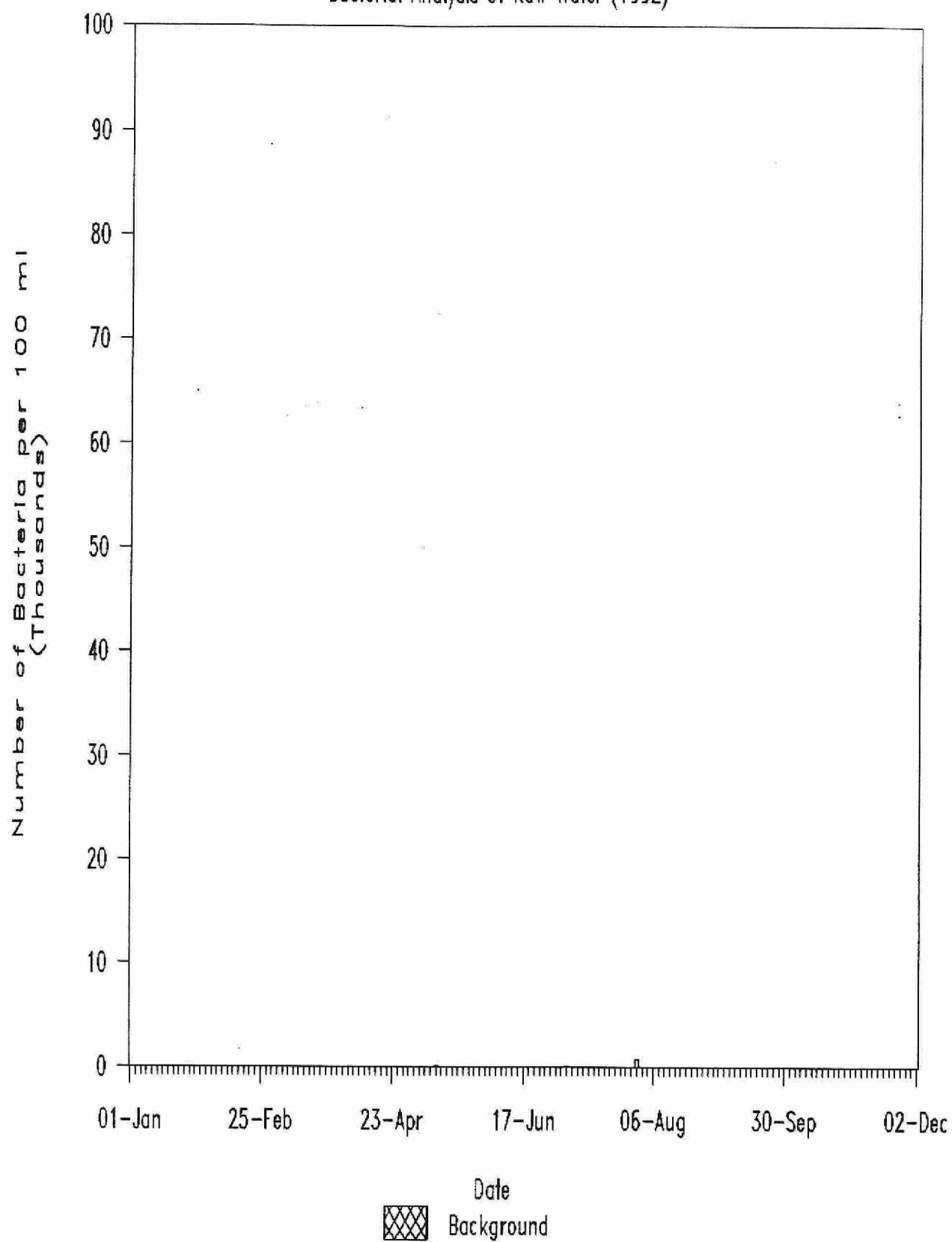
105

Bacterial Analysis of Raw Water (1992)



MERRICKVILLE

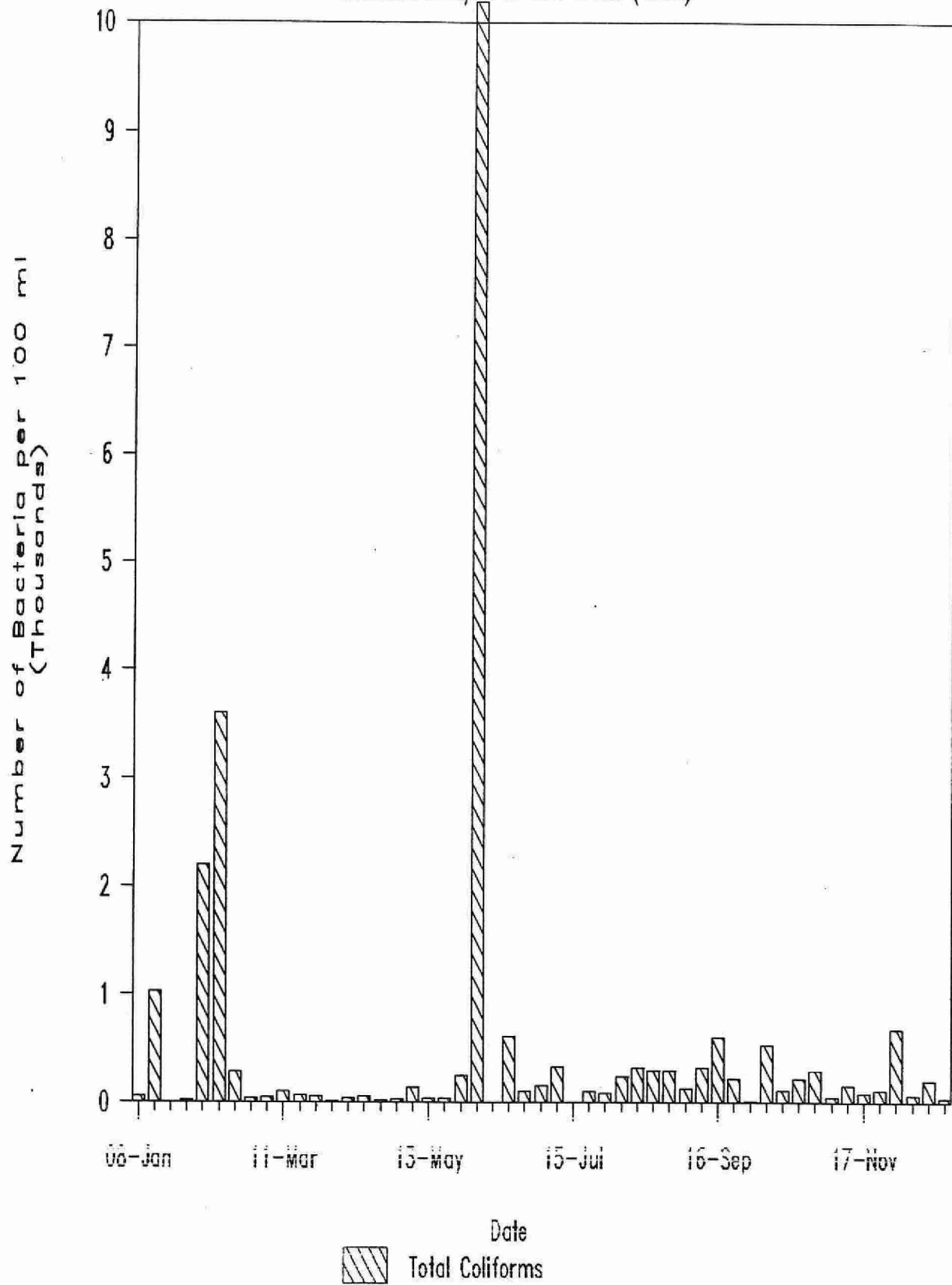
Bacterial Analysis of Raw Water (1992)



MORRISBURG

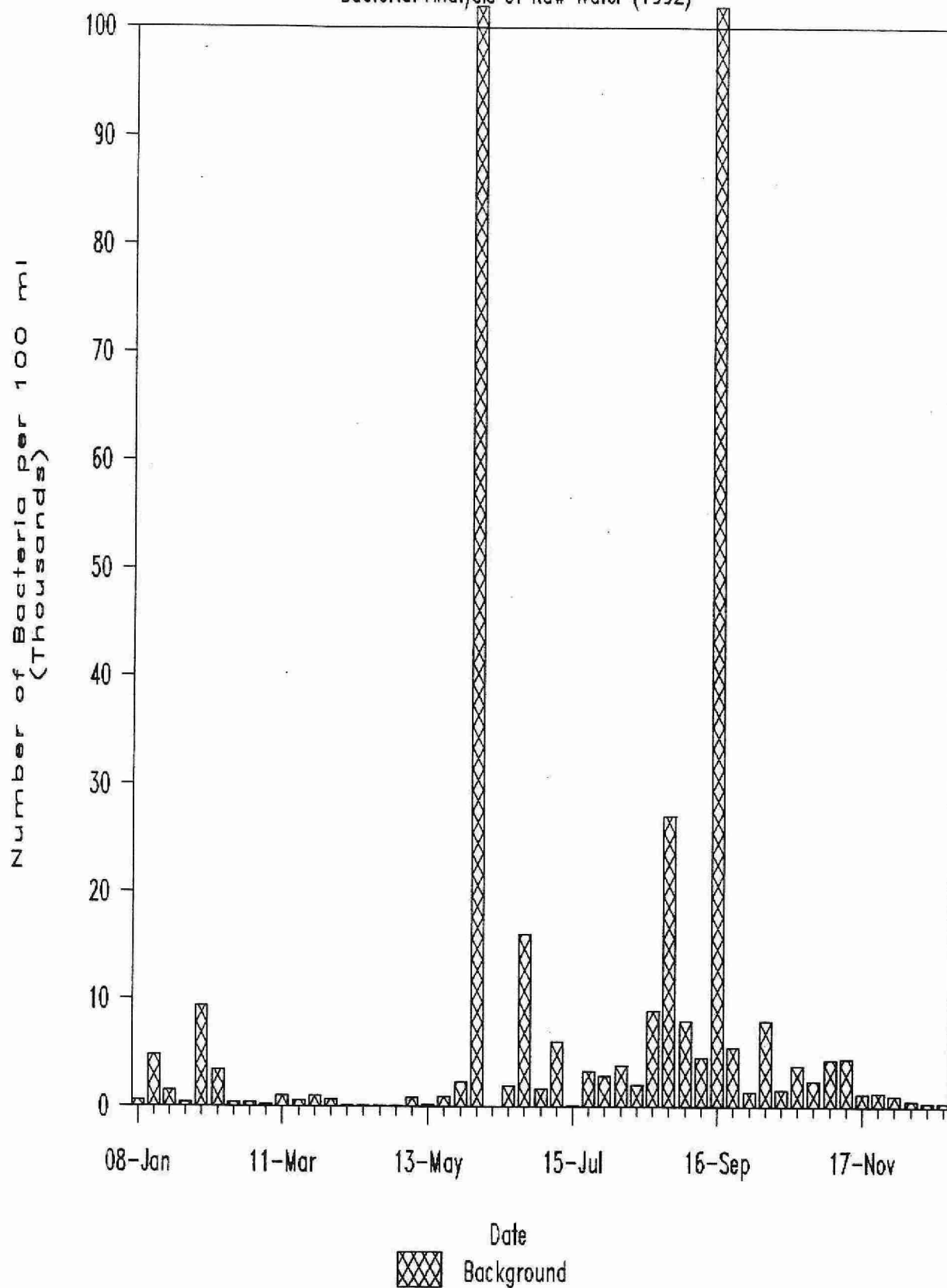
107

Bacterial Analysis of Raw Water (1992)



MORRISBURG

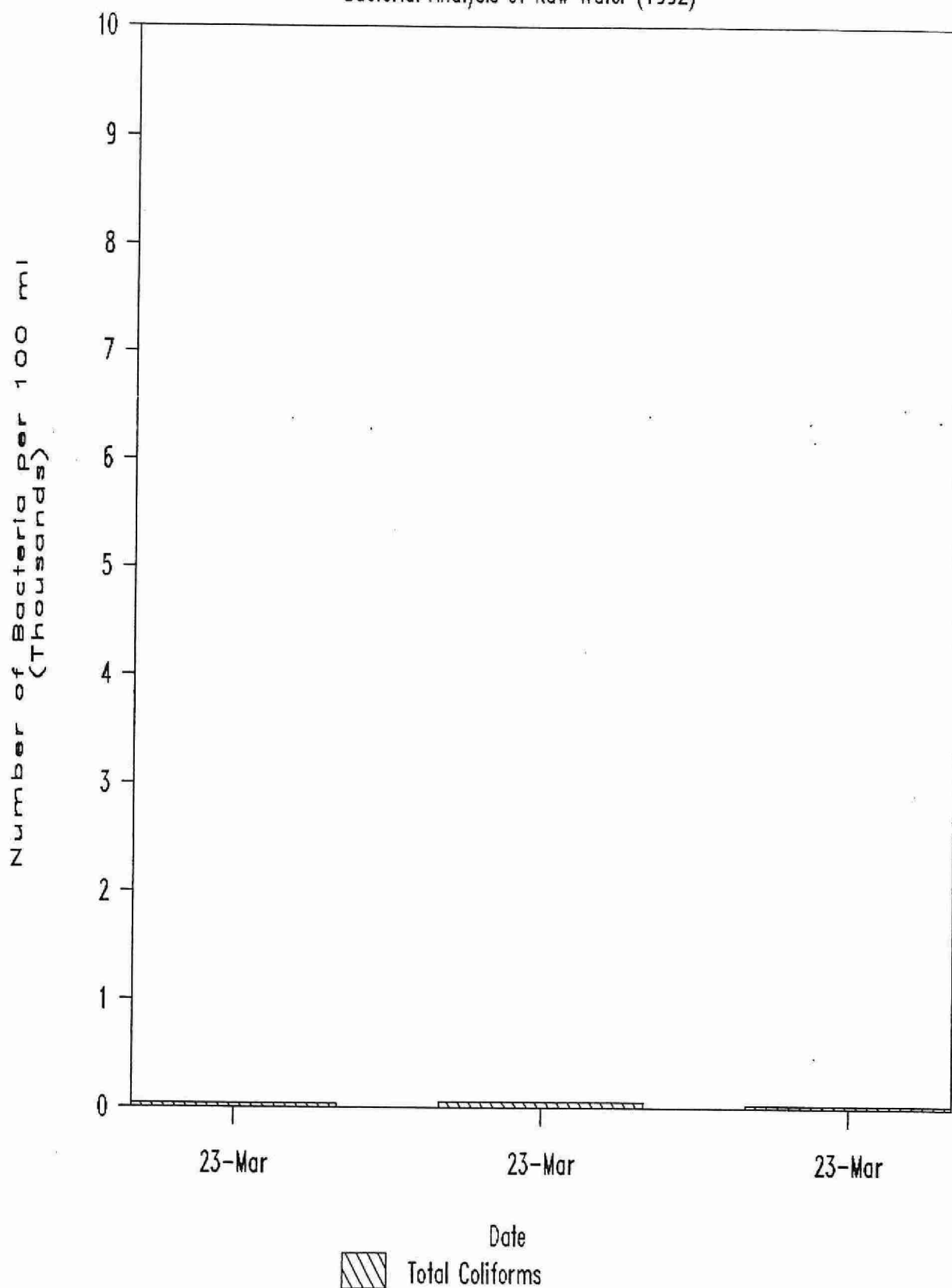
Bacterial Analysis of Raw Water (1992)



MURRAY (TRENTON MHP)

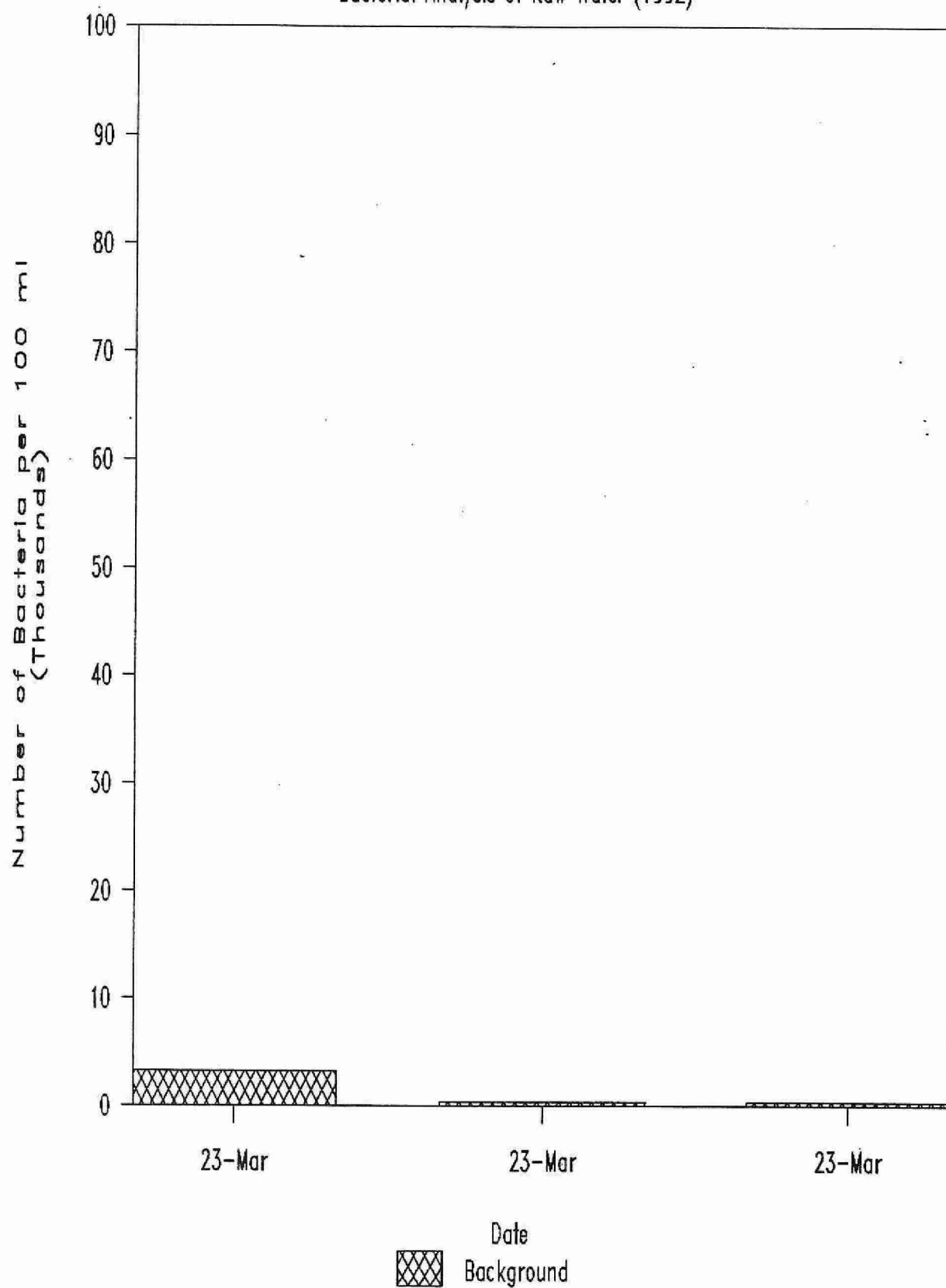
109

Bacterial Analysis of Raw Water (1992)



MURRAY (TRENTON MHP)

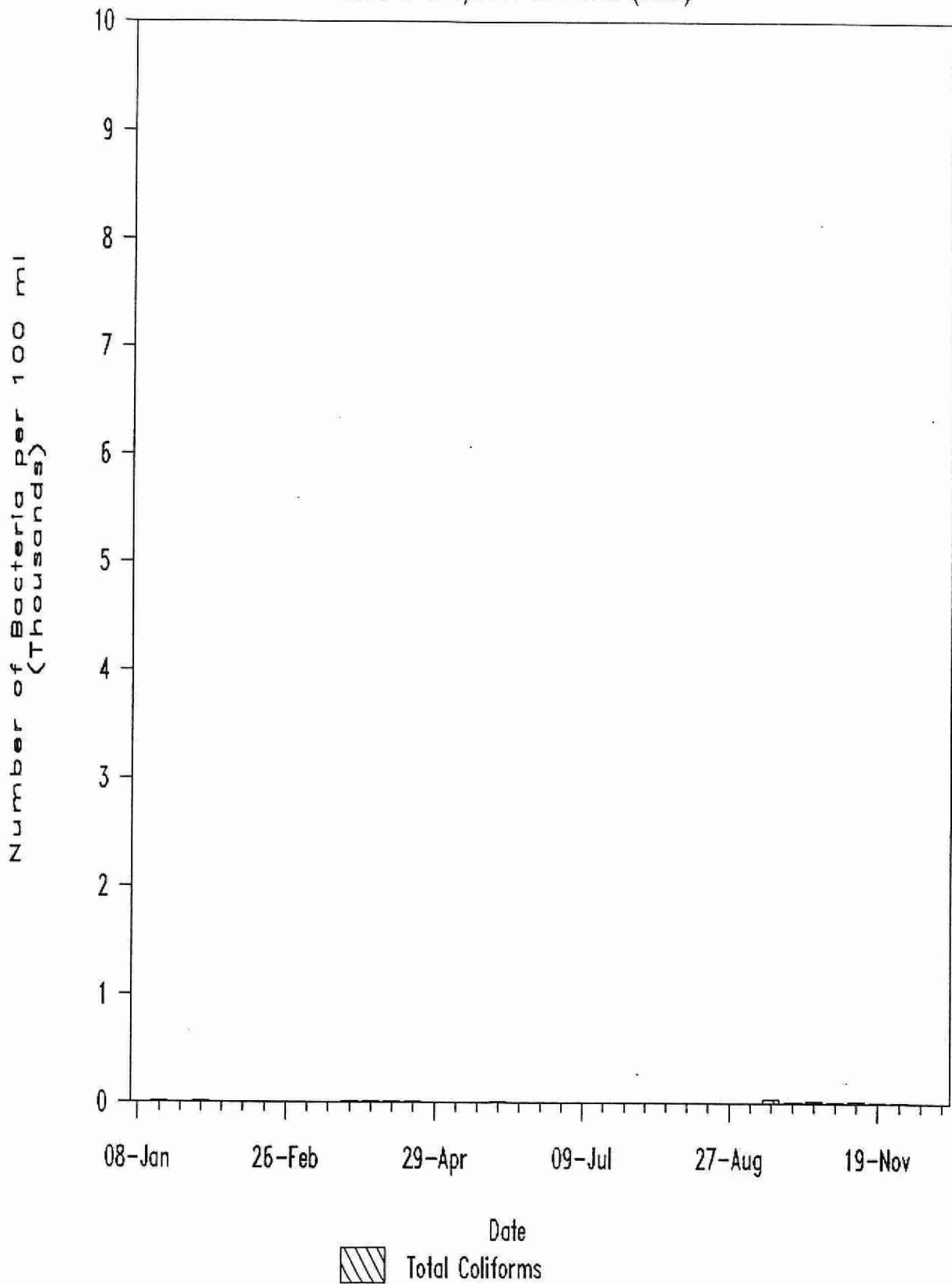
Bacterial Analysis of Raw Water (1992)



NAPANEE

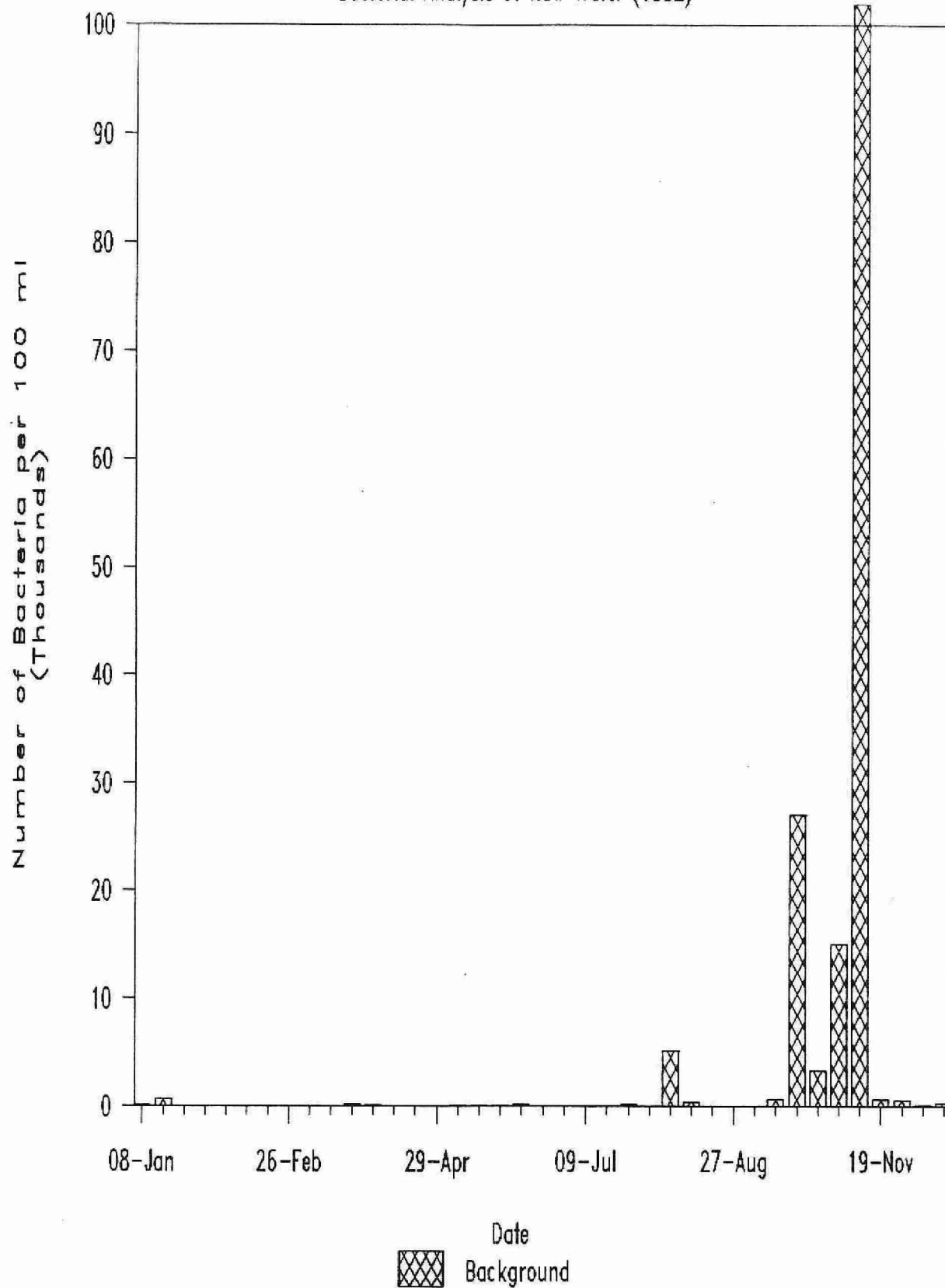
111

Bacterial Analysis of Raw Water (1992)



NAPANEE

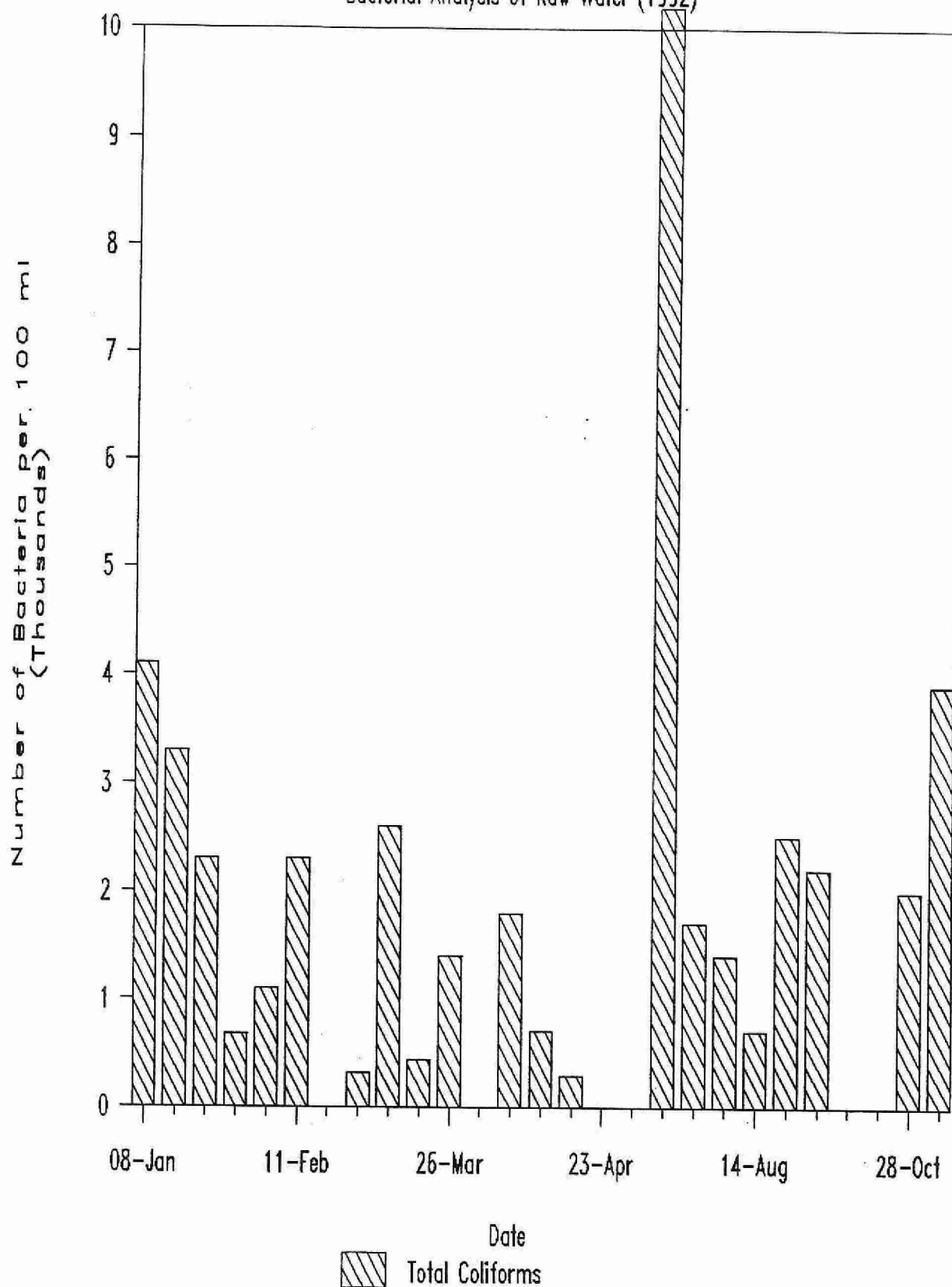
Bacterial Analysis of Raw Water (1992)



NO. PLANTAGENET TWP (DOMAINE PRUDHOMME)

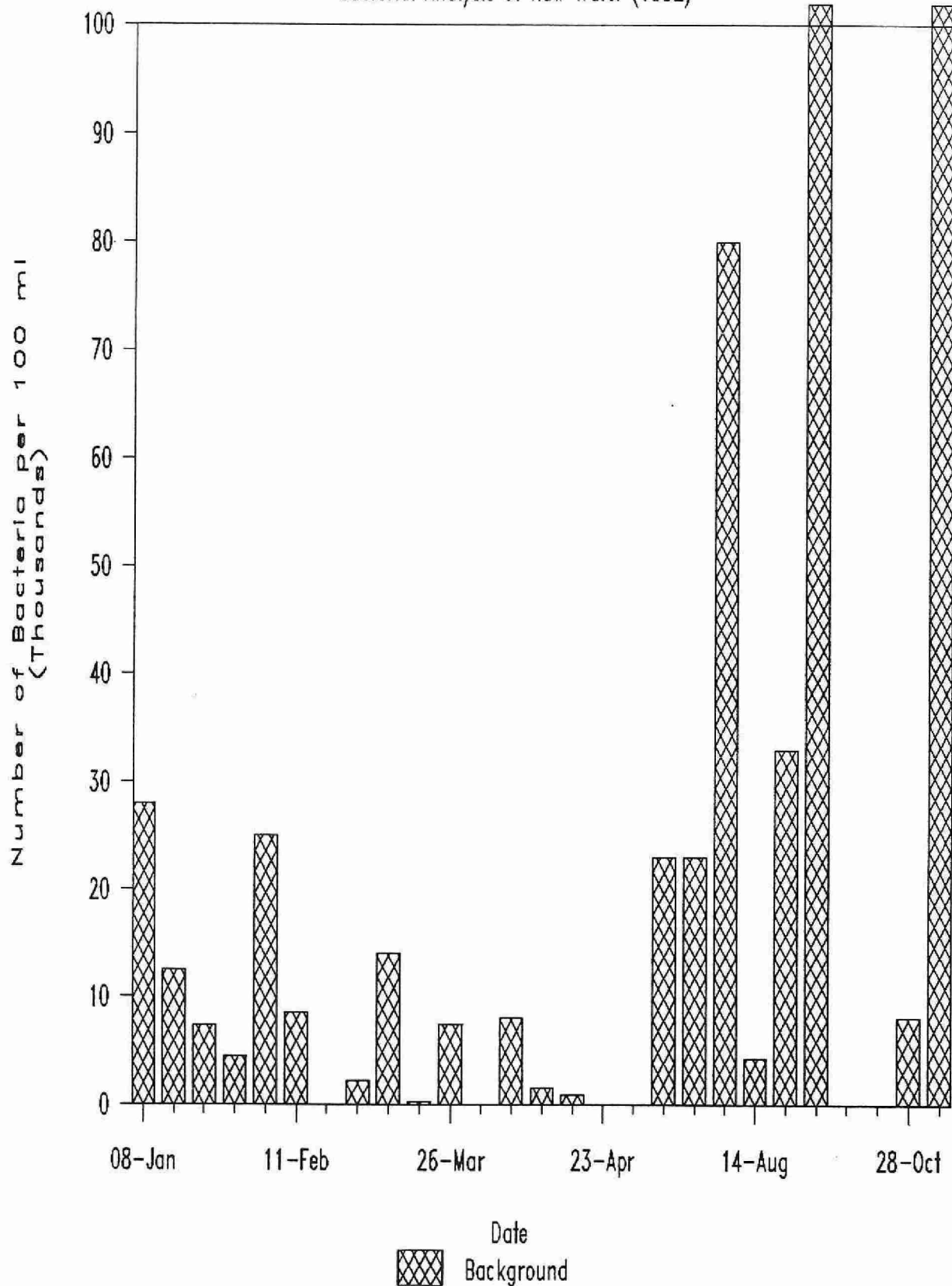
113

Bacterial Analysis of Raw Water (1992)



NO. PLANTAGENET TWP (DOMAINE PRUDHOMME)

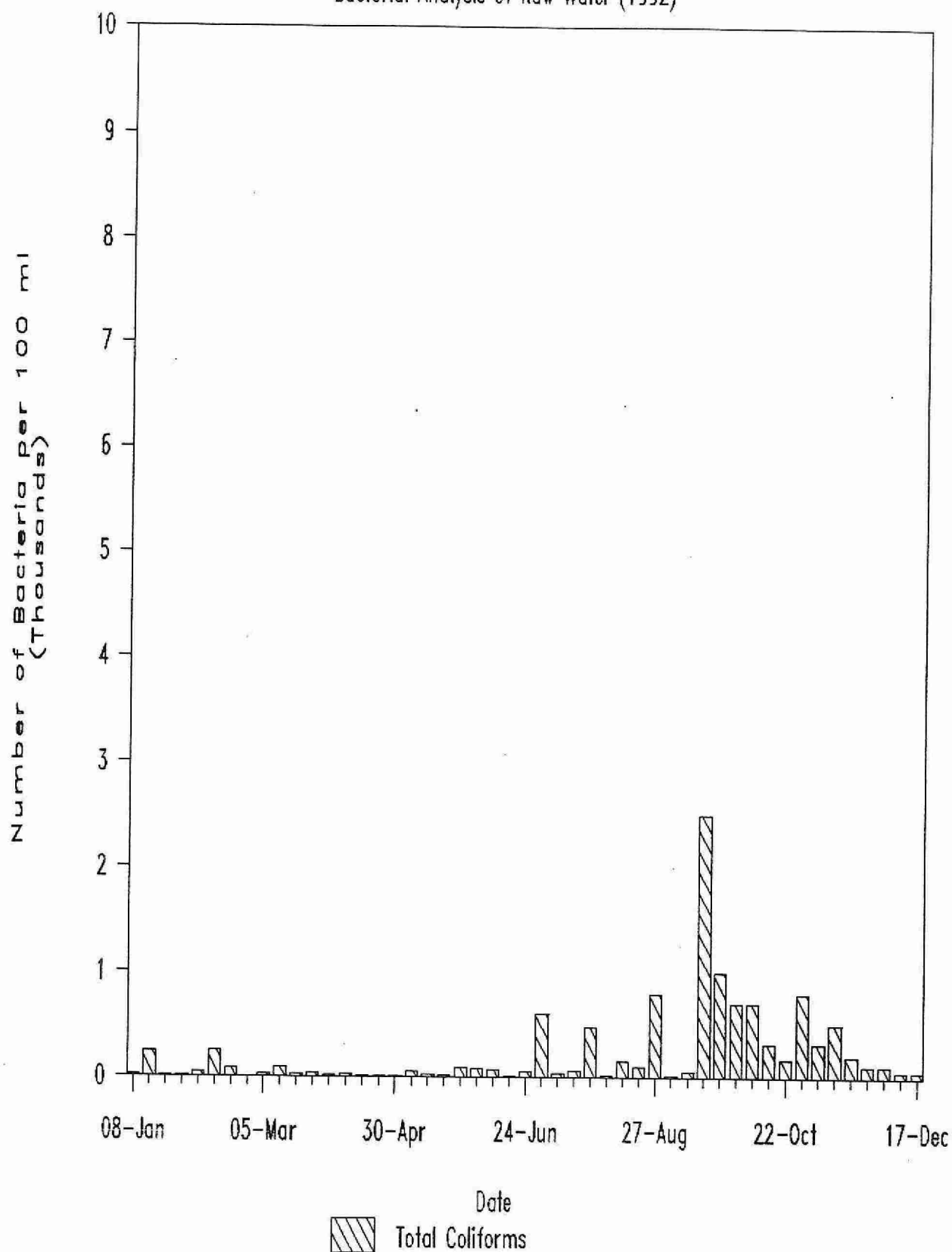
Bacterial Analysis of Raw Water (1992)



OSNABRUCK TWP (INGLESIDE)

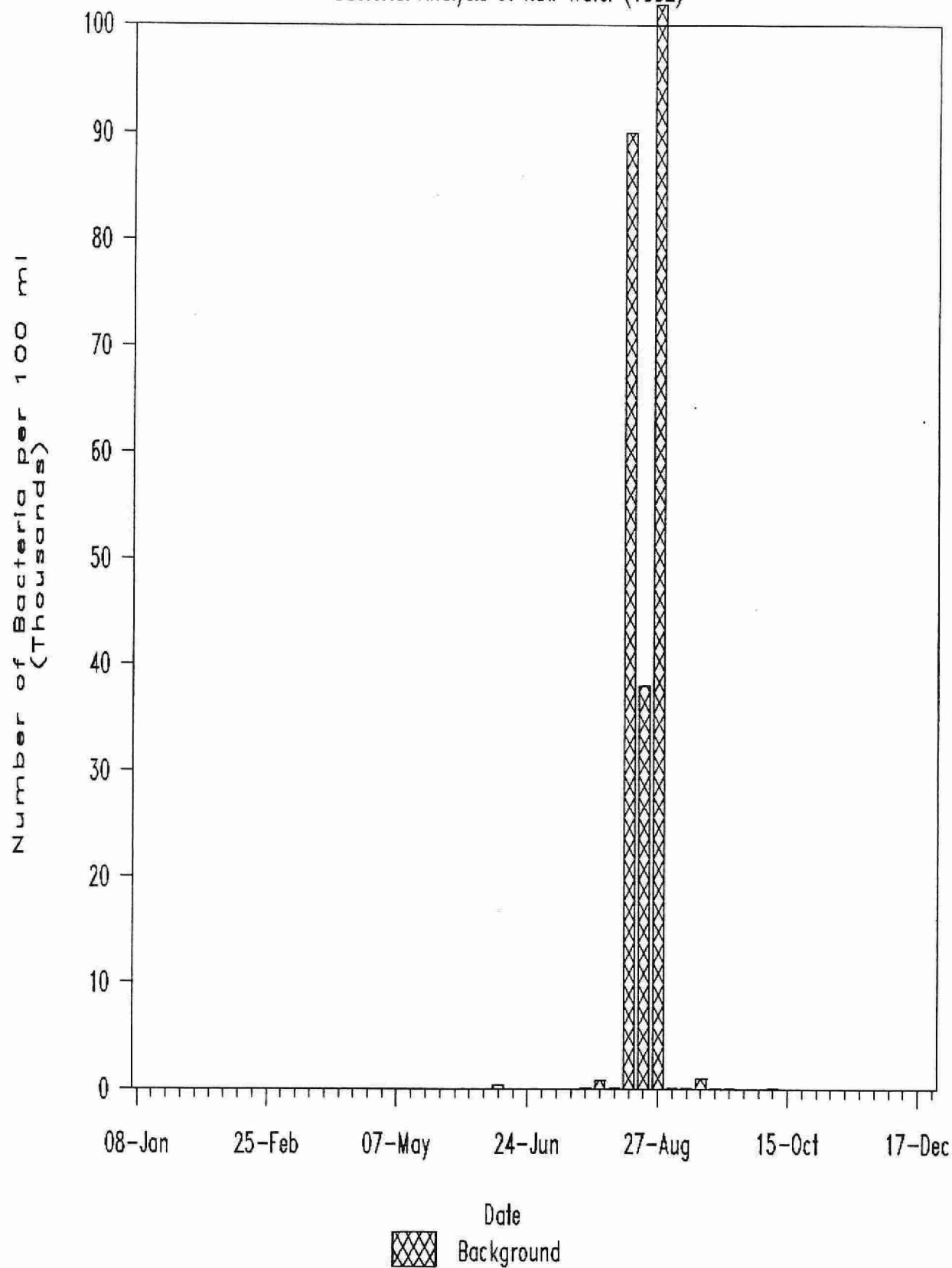
115

Bacterial Analysis of Raw Water (1992)



OSNABRUCK (INGLESIDE)

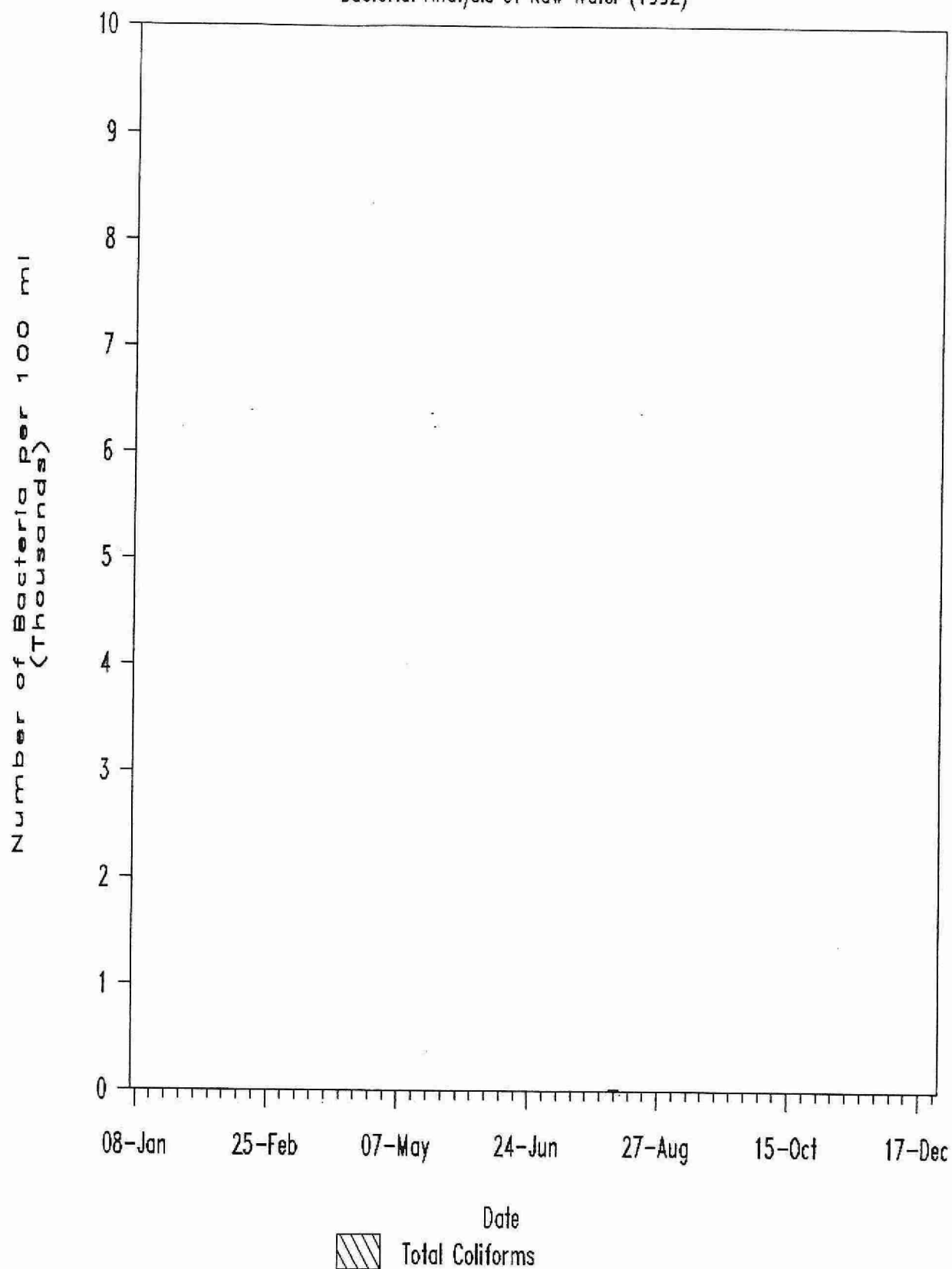
Bacterial Analysis of Raw Water (1992)



OSNABRUCK TWP (NEWINGTON)

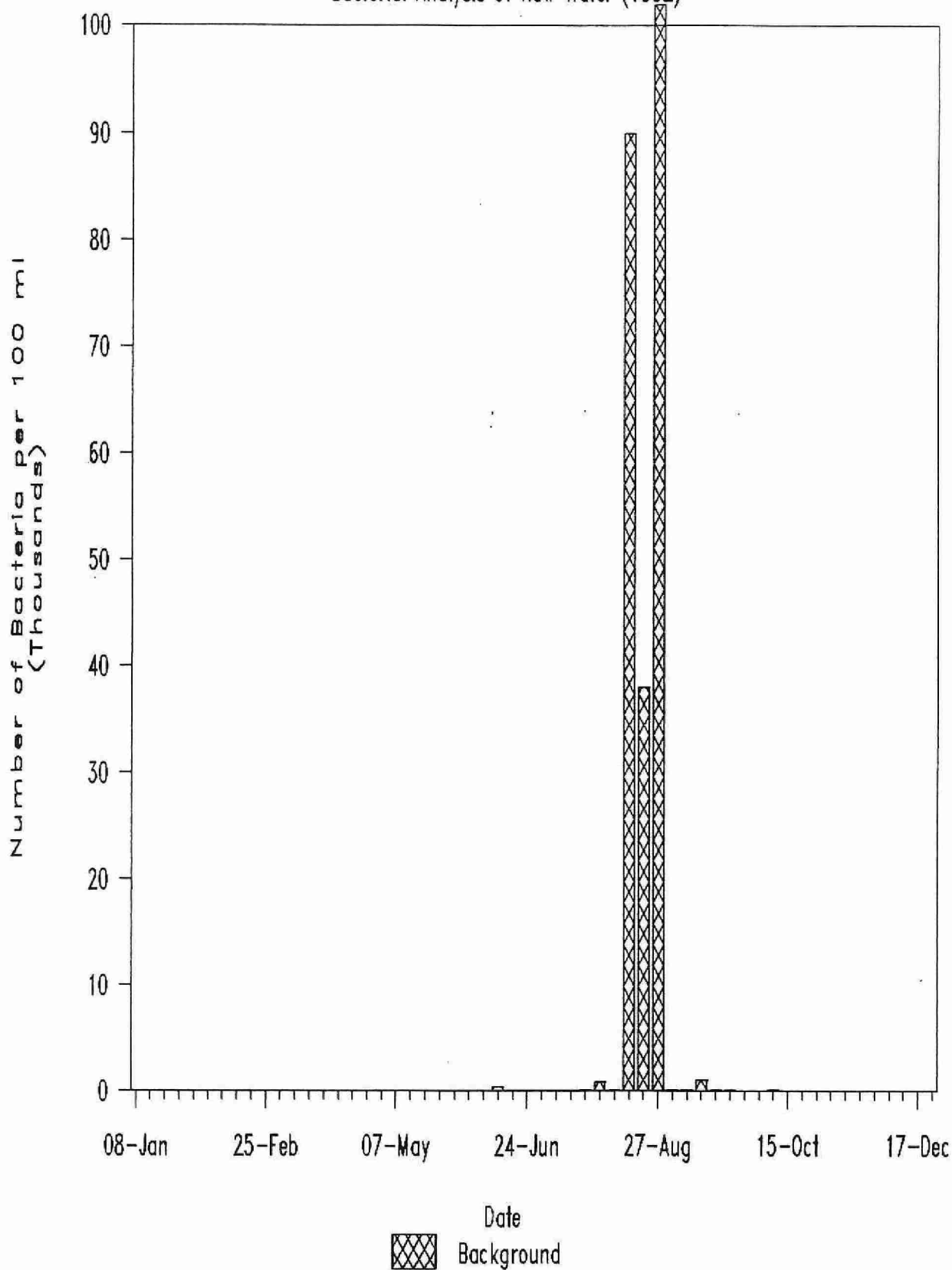
117

Bacterial Analysis of Raw Water (1992)



OSNABRUCK (NEWINGTON)

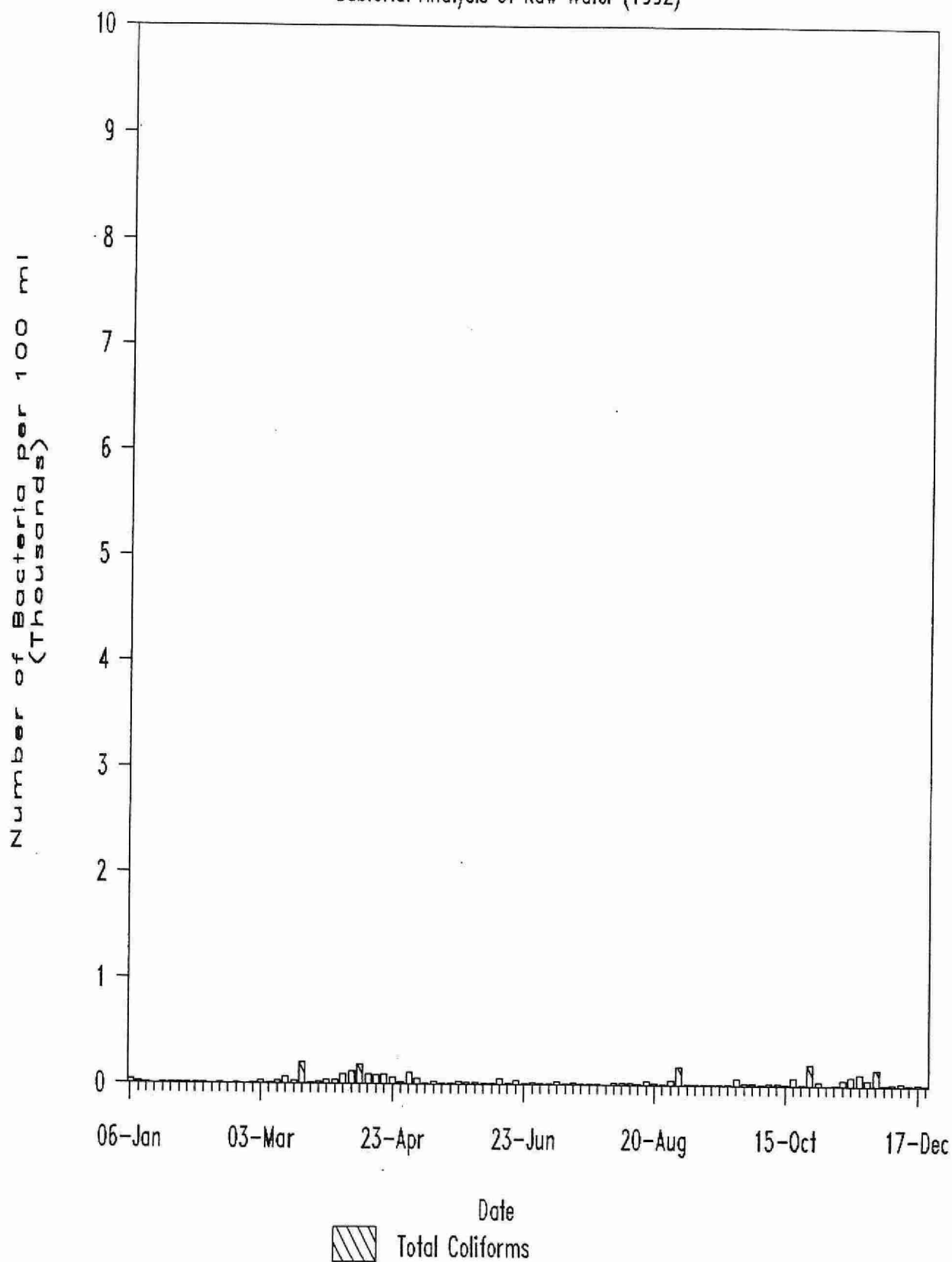
Bacterial Analysis of Raw Water (1992)



PEMBROKE

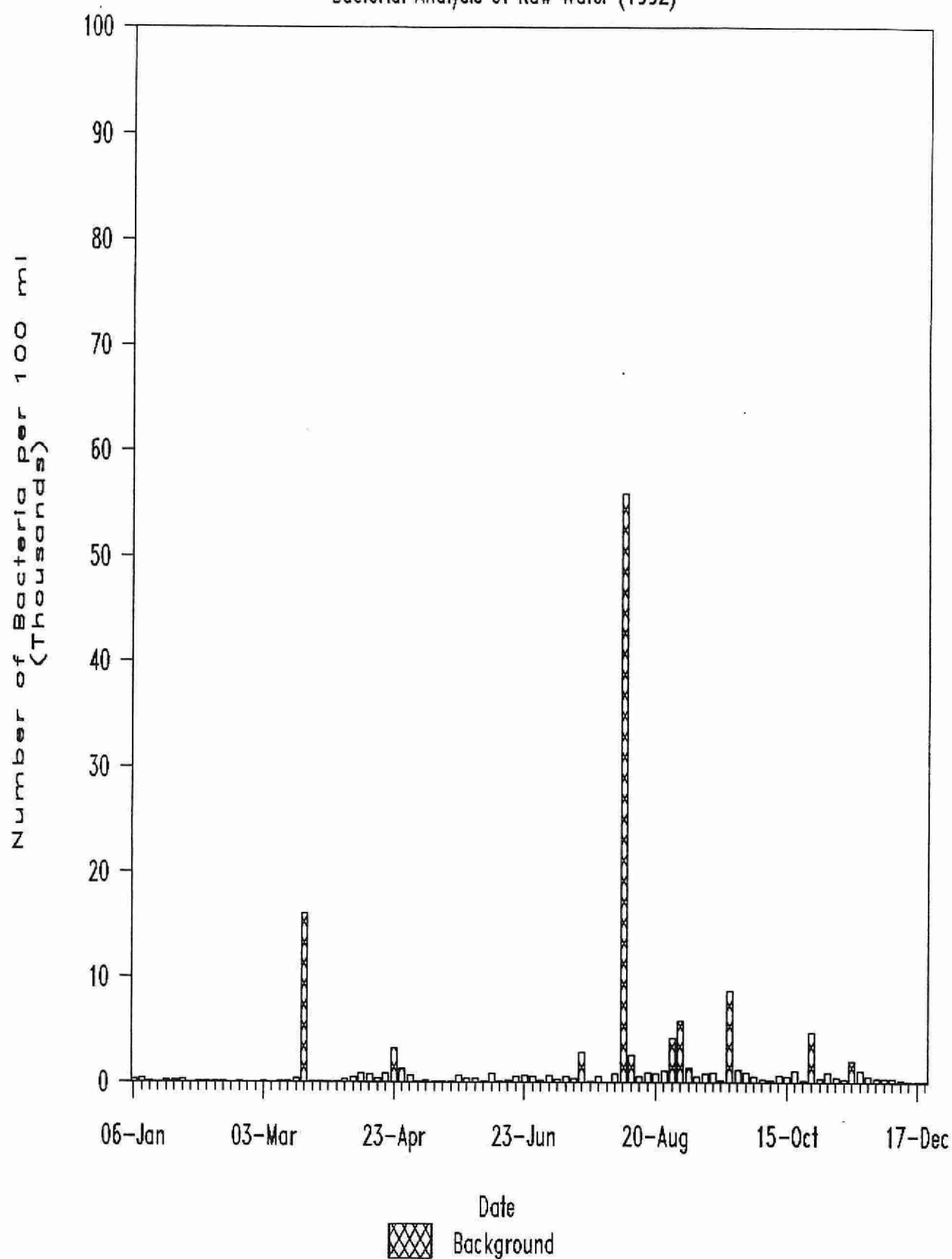
119

Bacterial Analysis of Raw Water (1992)



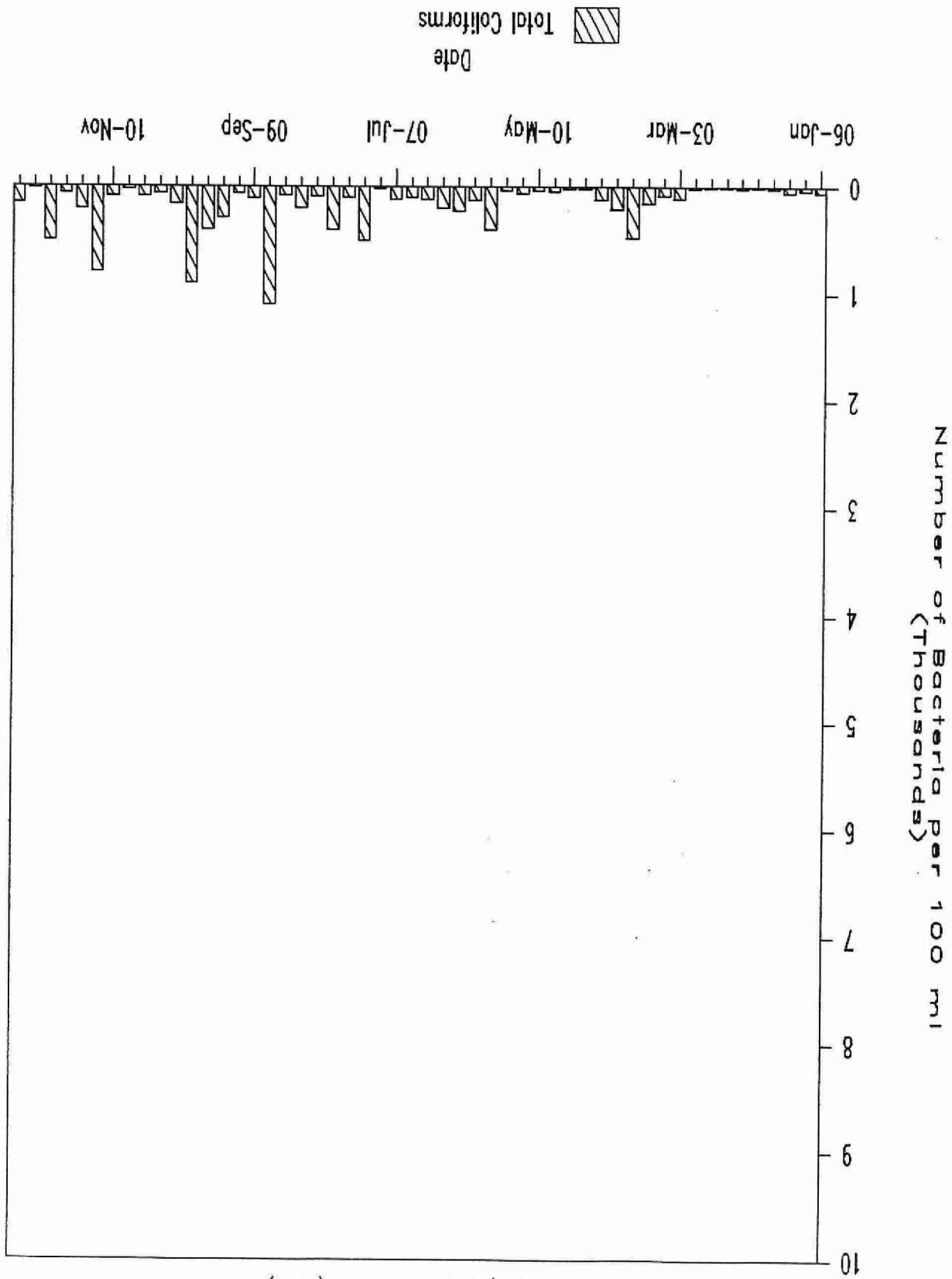
PEMBROKE

Bacterial Analysis of Raw Water (1992)



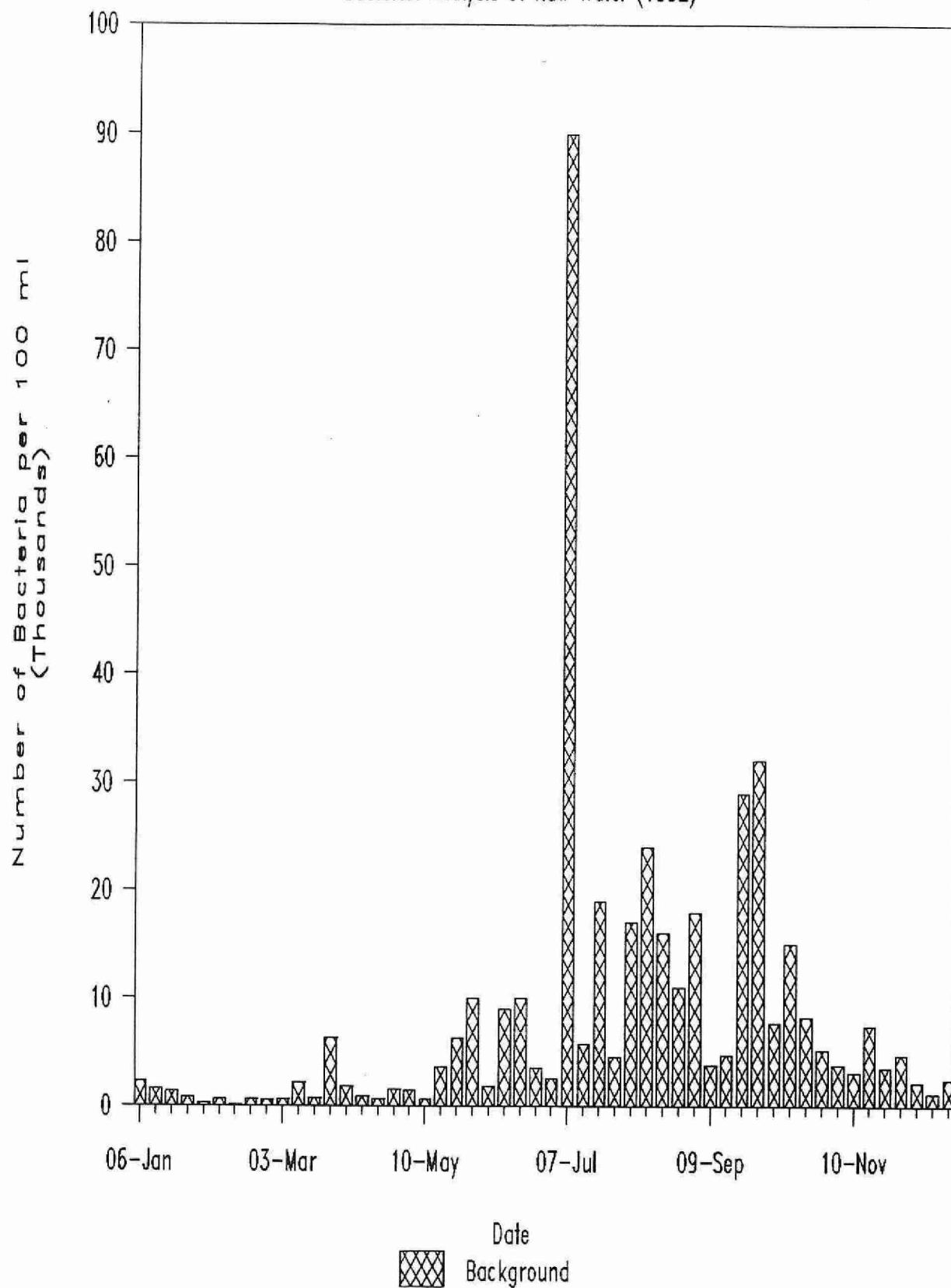
PERTH

Bacterial Analysis of Raw Water (1992)



PERTH

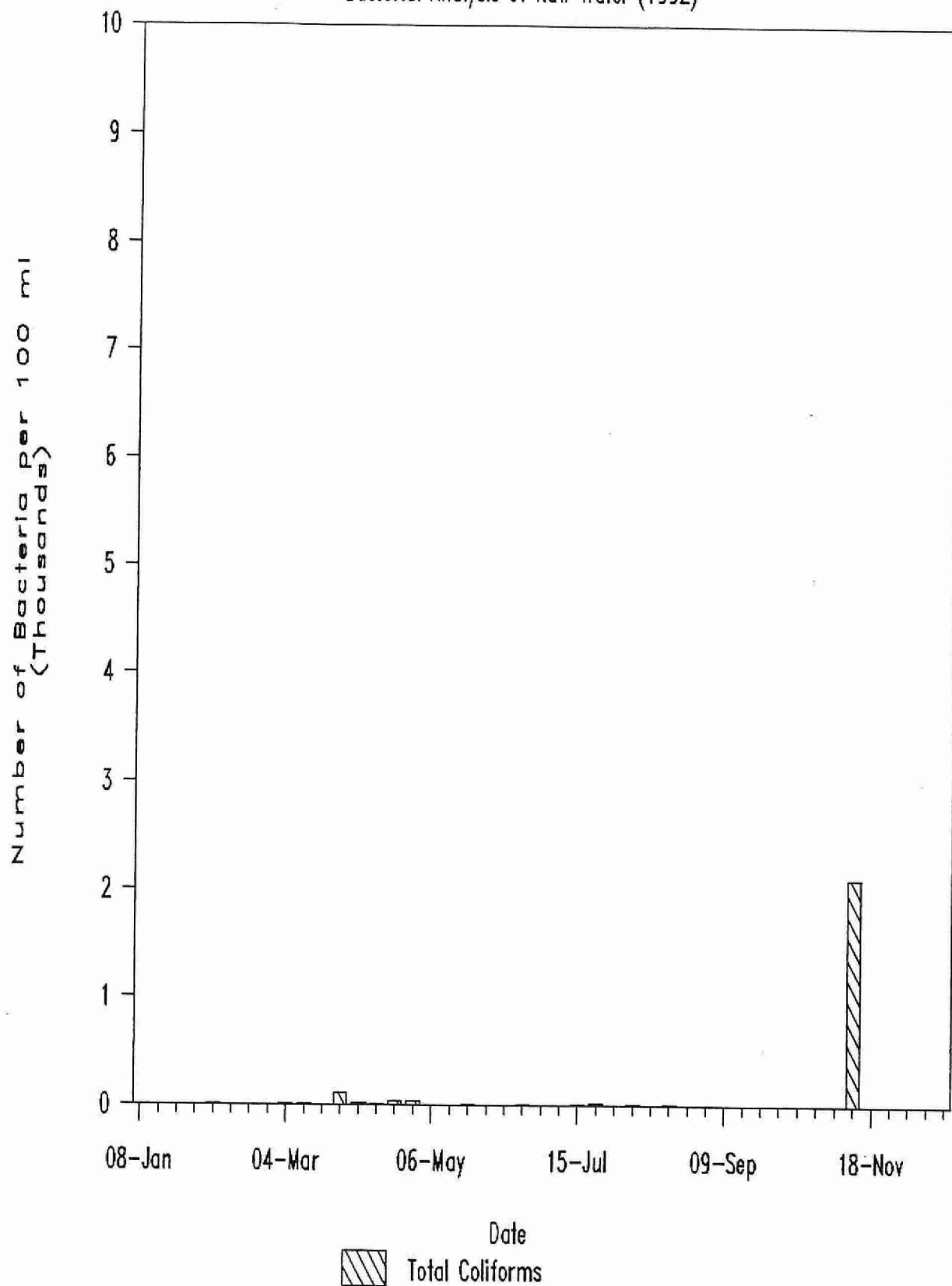
Bacterial Analysis of Raw Water (1992)



PICTON (TOWN)

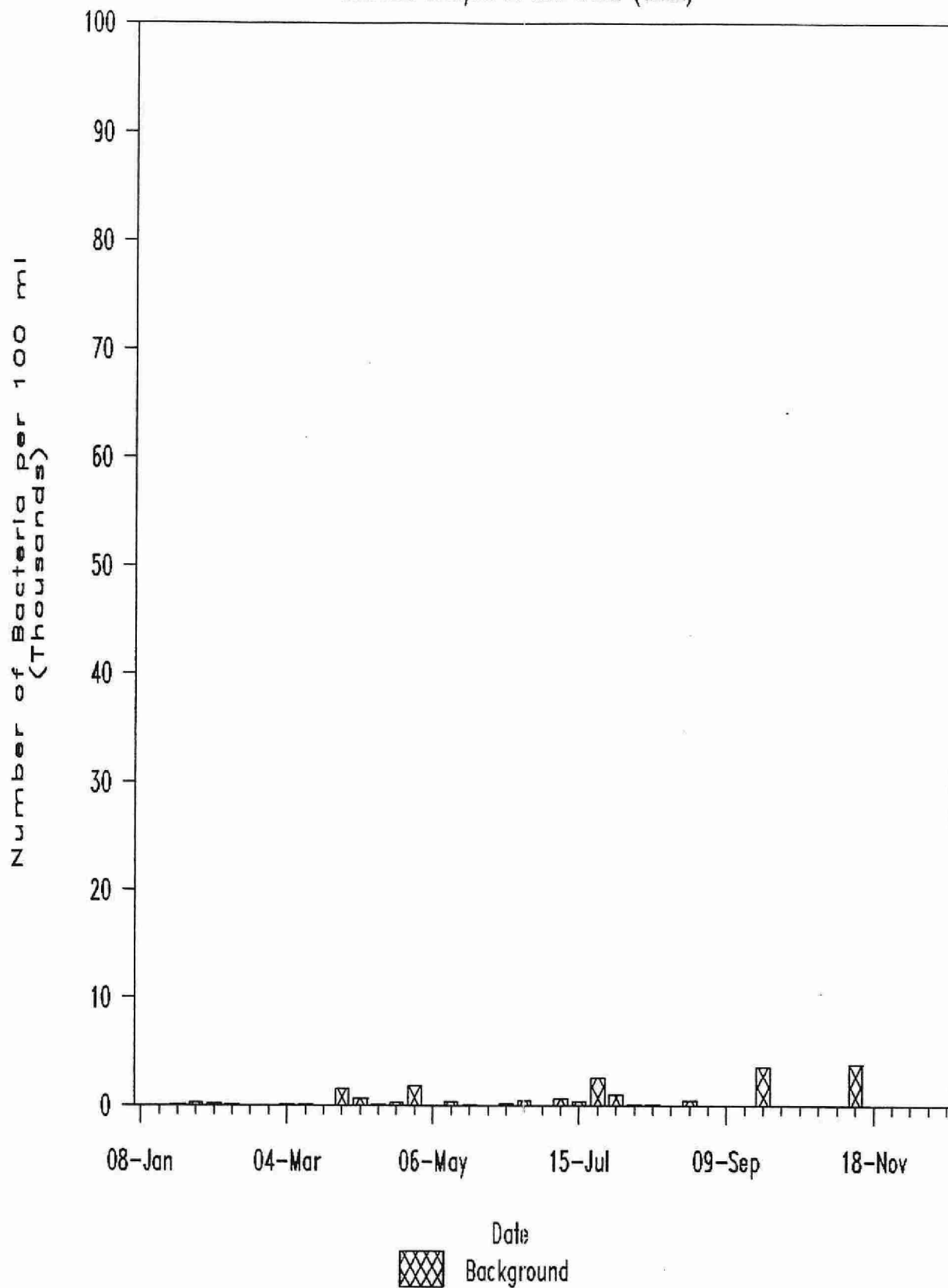
123

Bacterial Analysis of Raw Water (1992)



PICTON (TOWN)

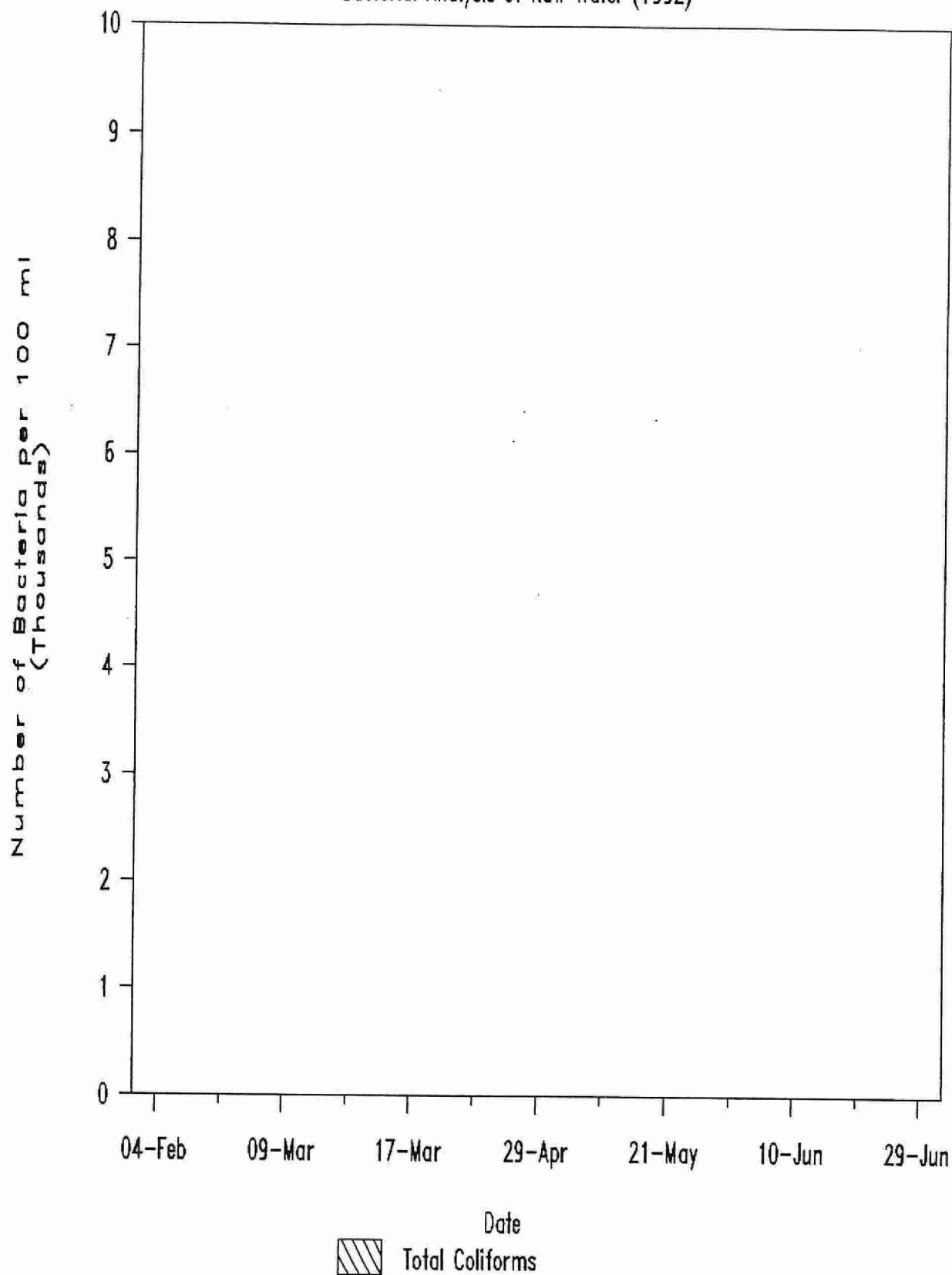
Bacterial Analysis of Raw Water (1992)



PITTSBURG TWP (TOWN)

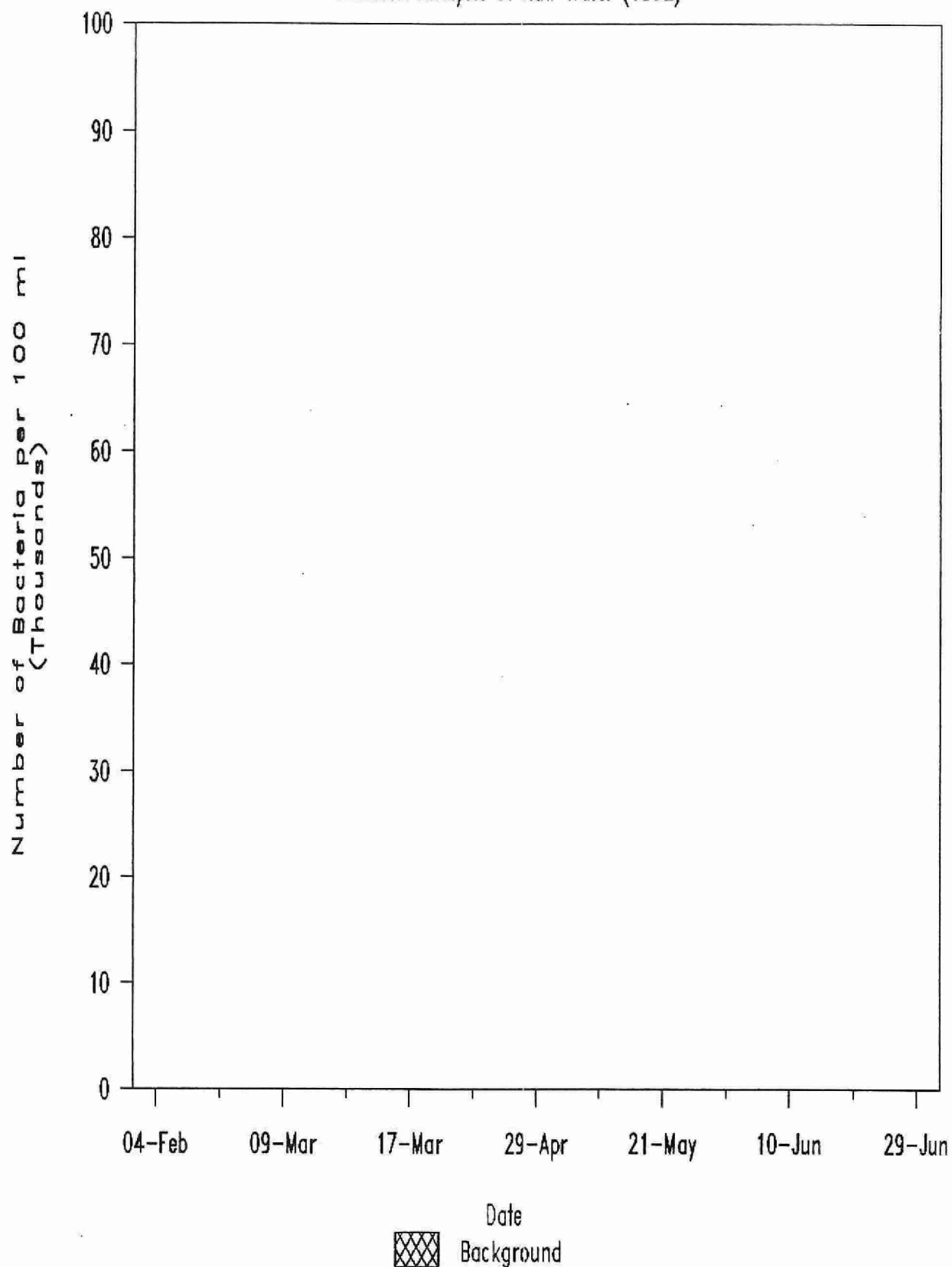
125

Bacterial Analysis of Raw Water (1992)



PITTSBURG TWP (TOWN)

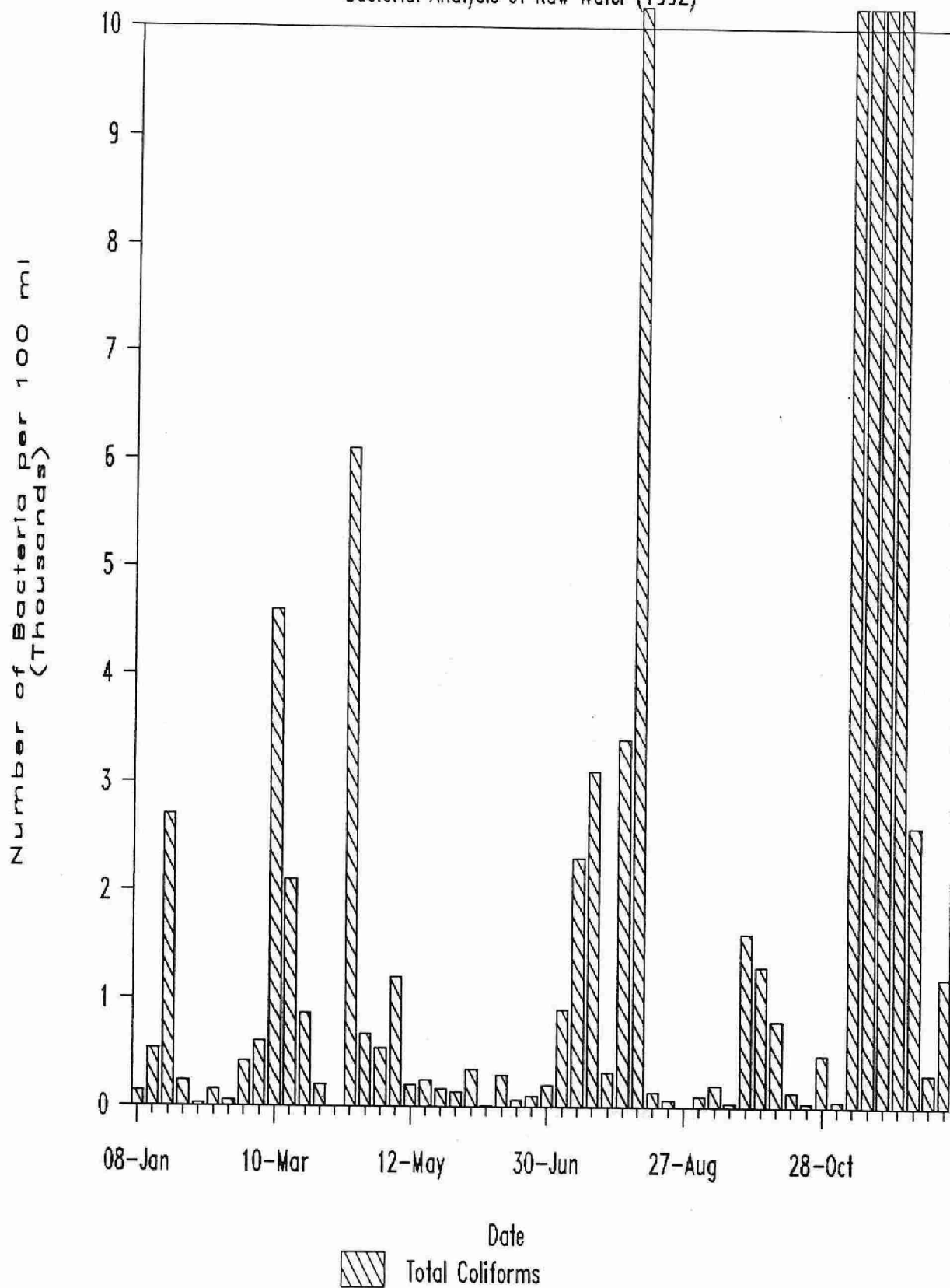
Bacterial Analysis of Raw Water (1992)



PLANTAGENET

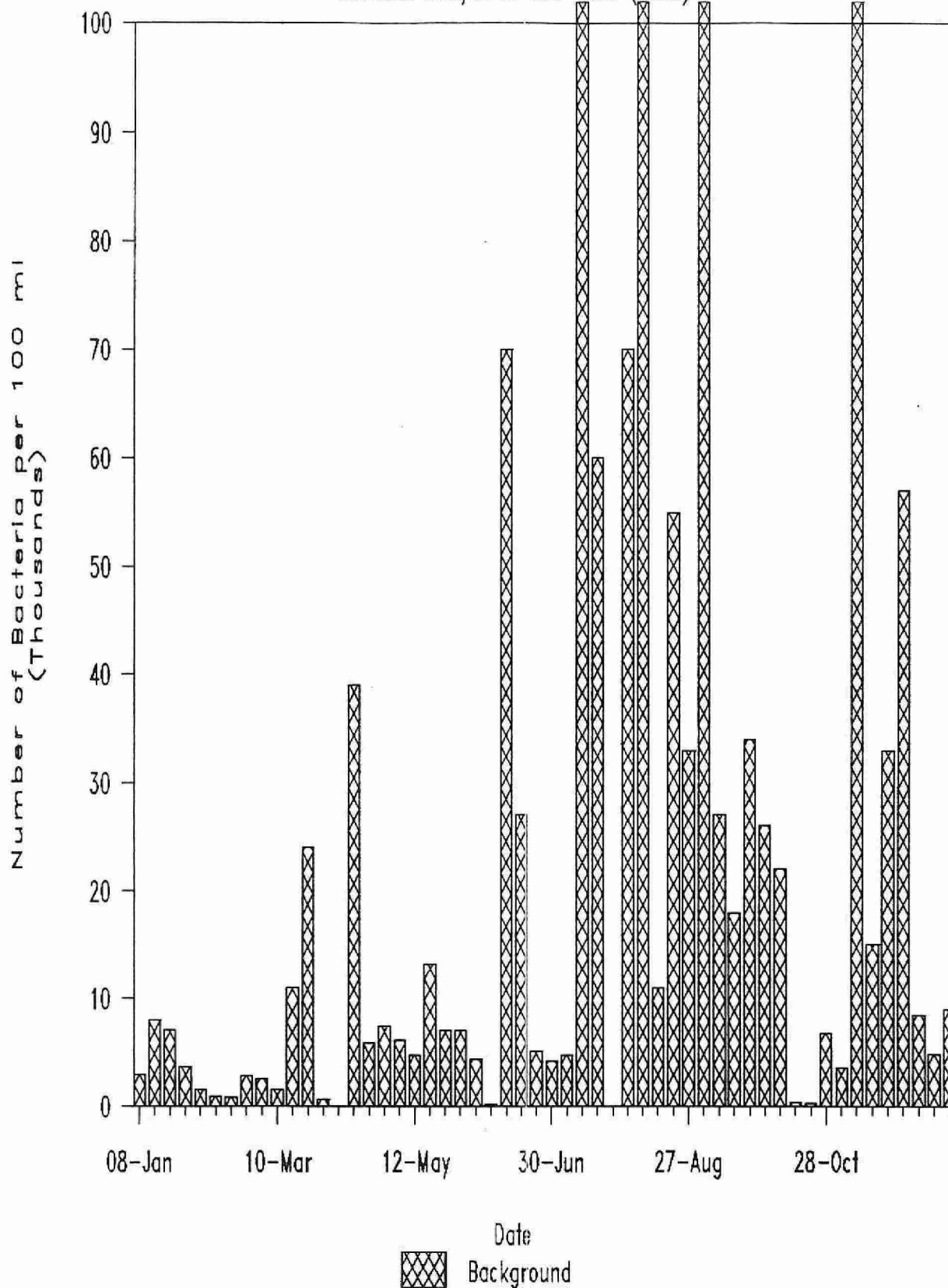
127

Bacterial Analysis of Raw Water (1992)



PLANTAGENET (UO)

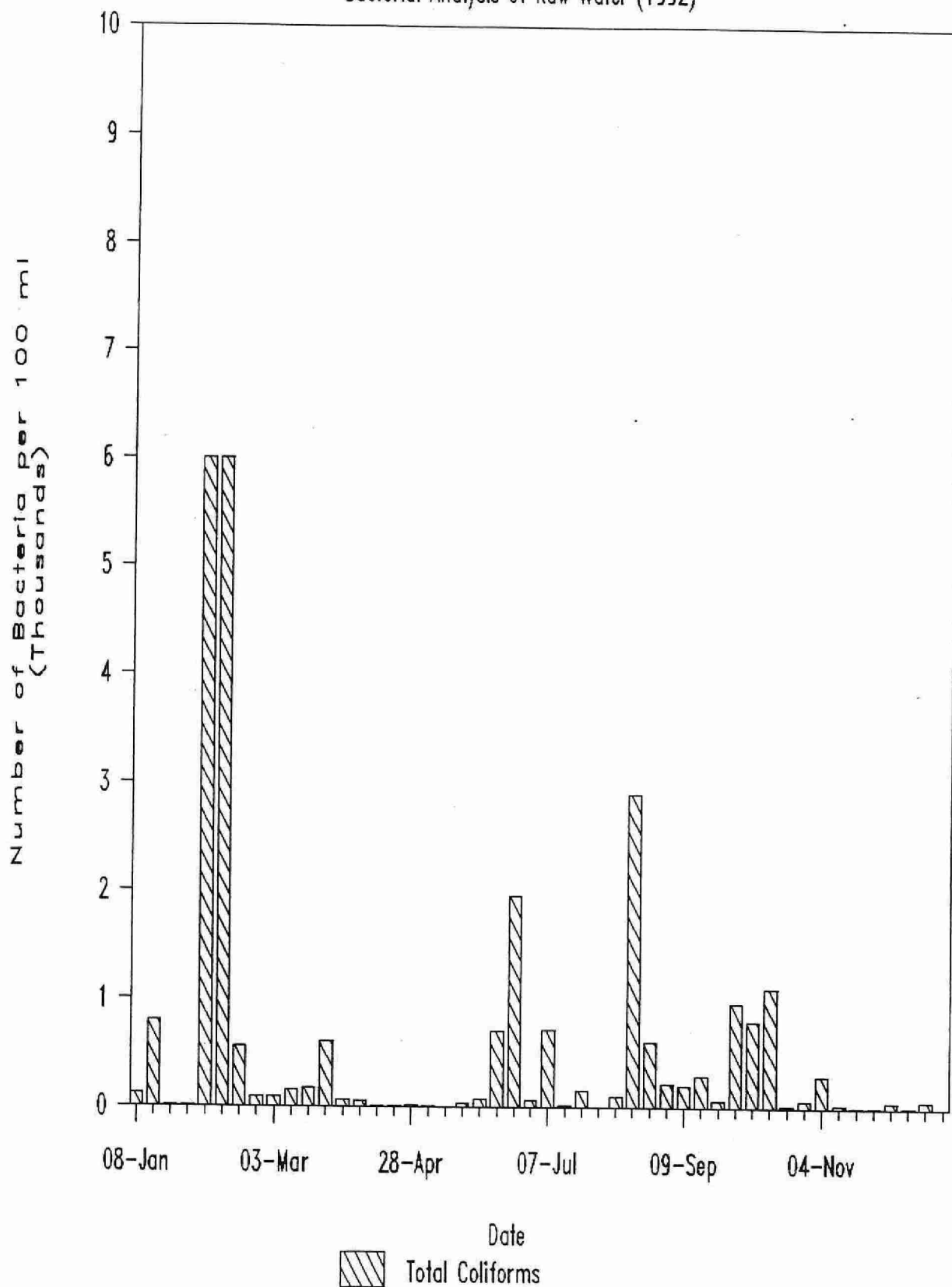
Bacterial Analysis of Raw Water (1992)



PRESCOTT (TOWN)

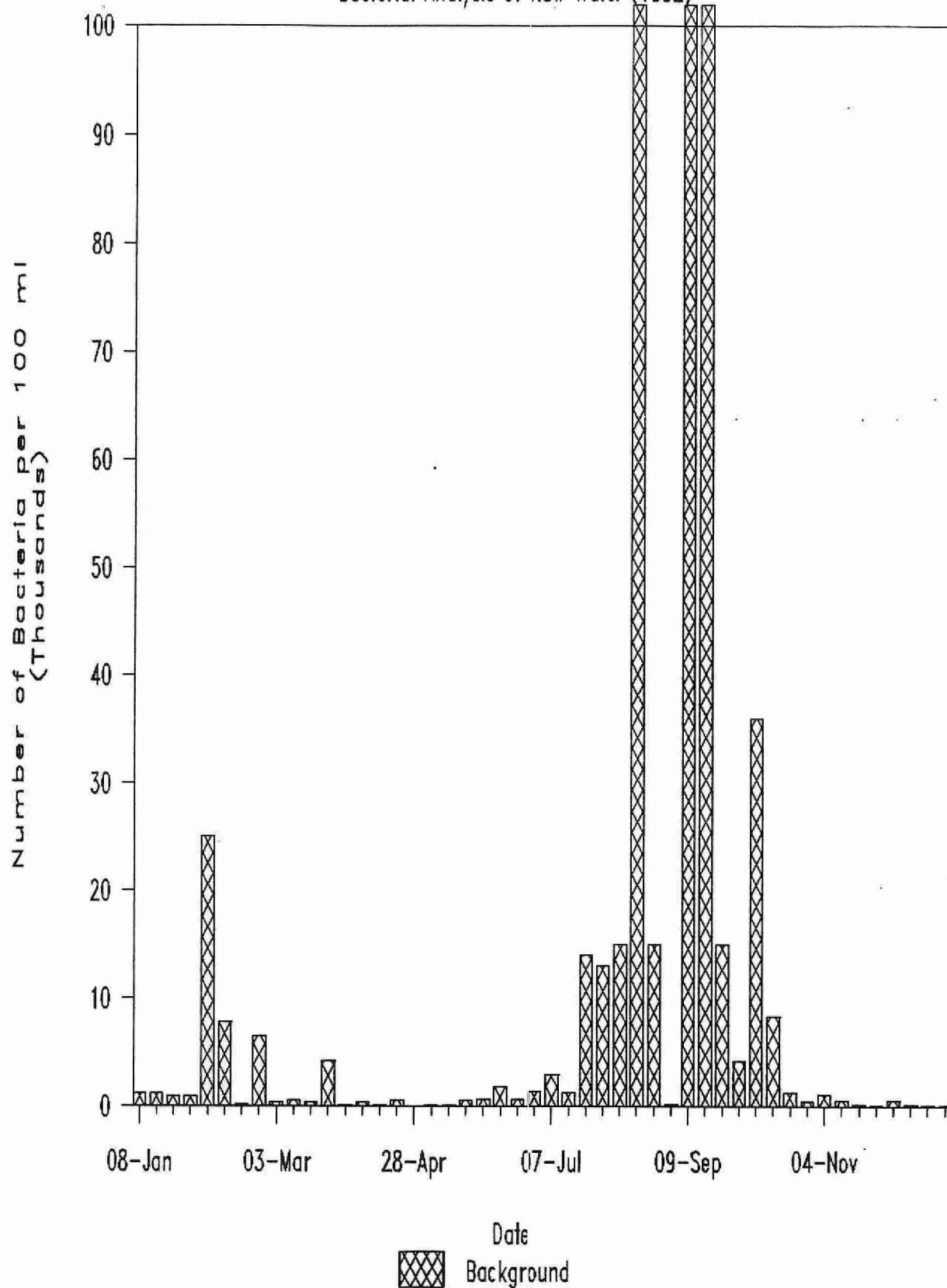
129

Bacterial Analysis of Raw Water (1992)



PRESCOTT (TOWN)

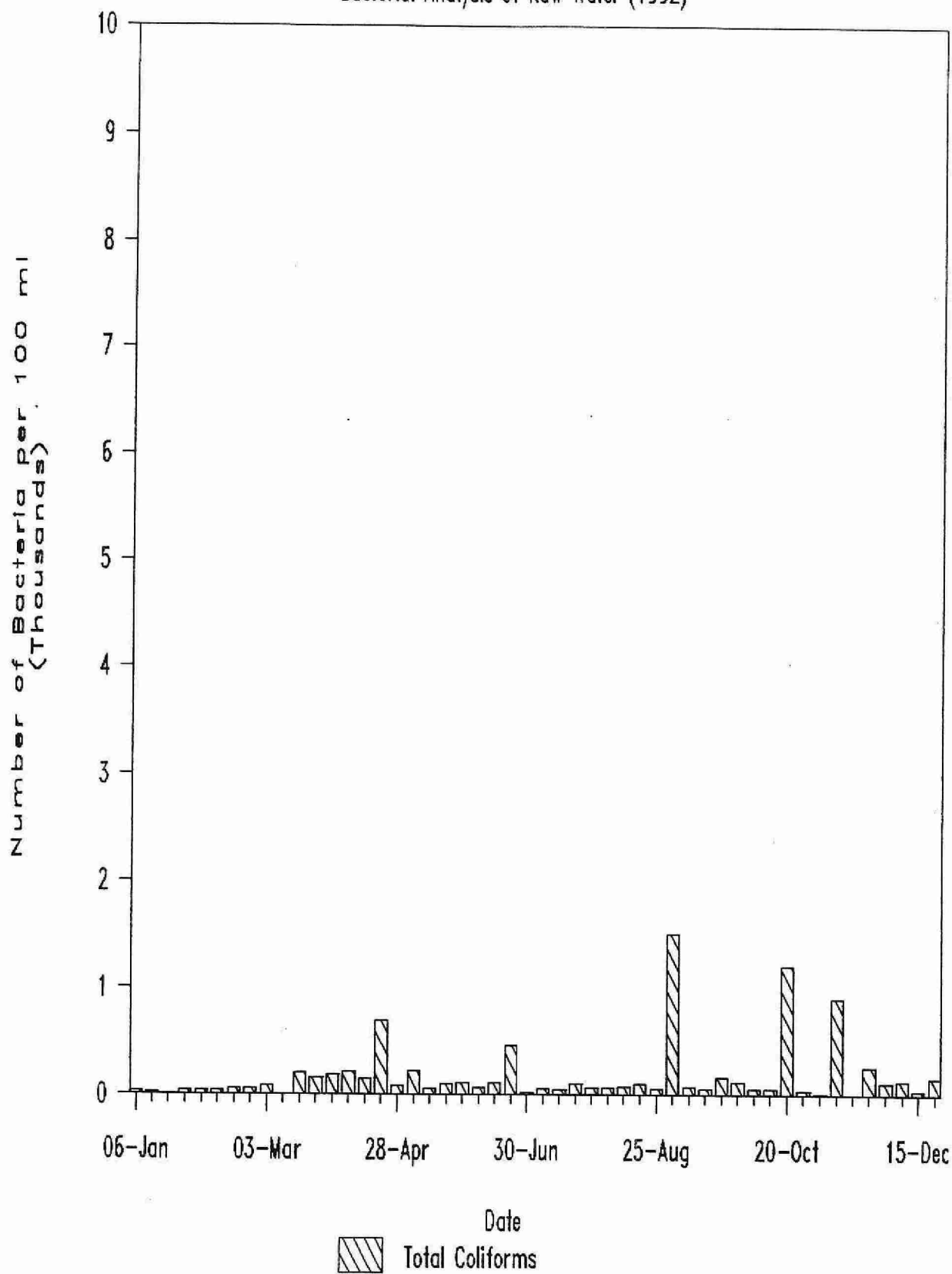
Bacterial Analysis of Raw Water (1992)



RENFREW

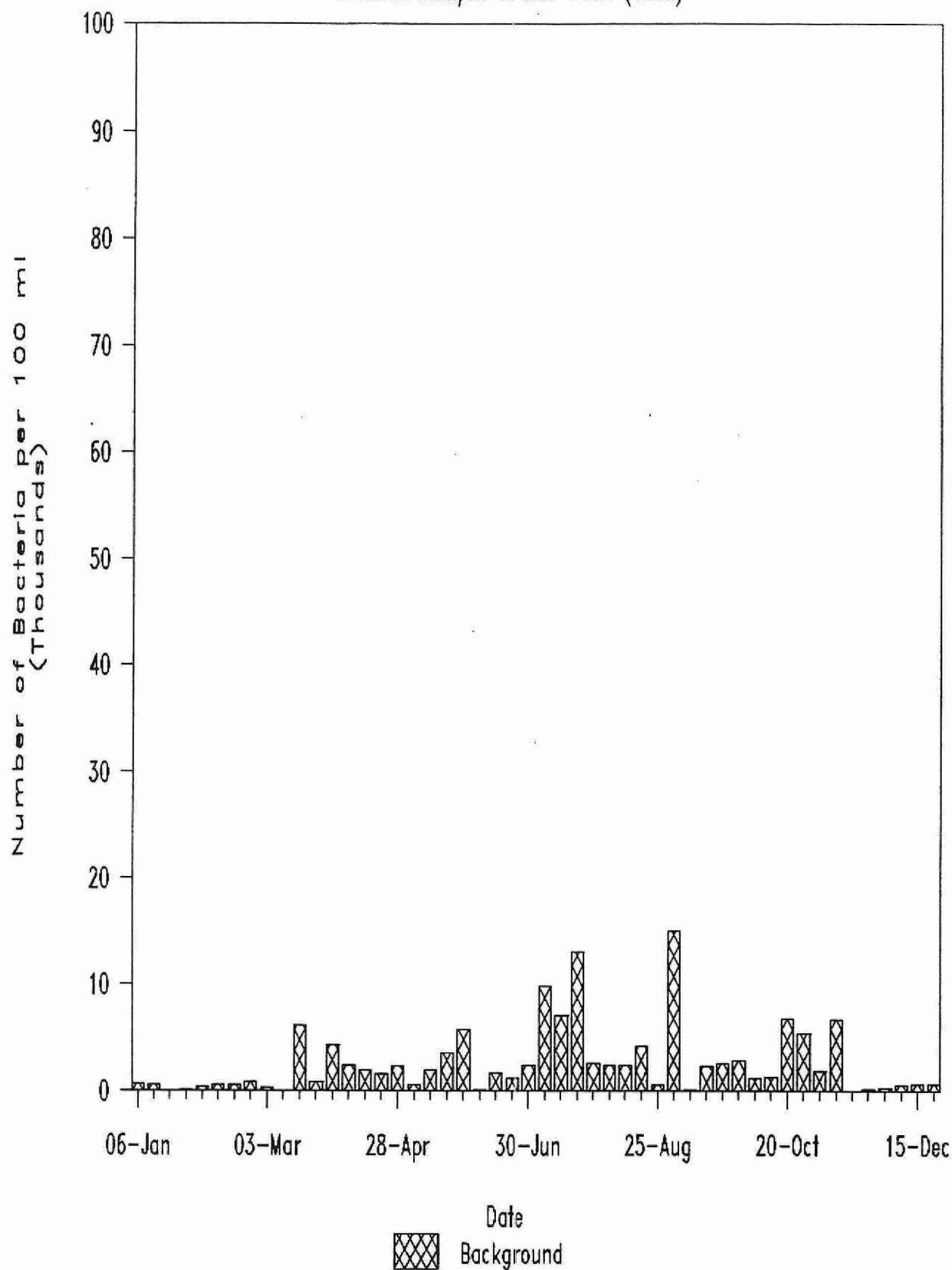
131

Bacterial Analysis of Raw Water (1992)



RENFREW

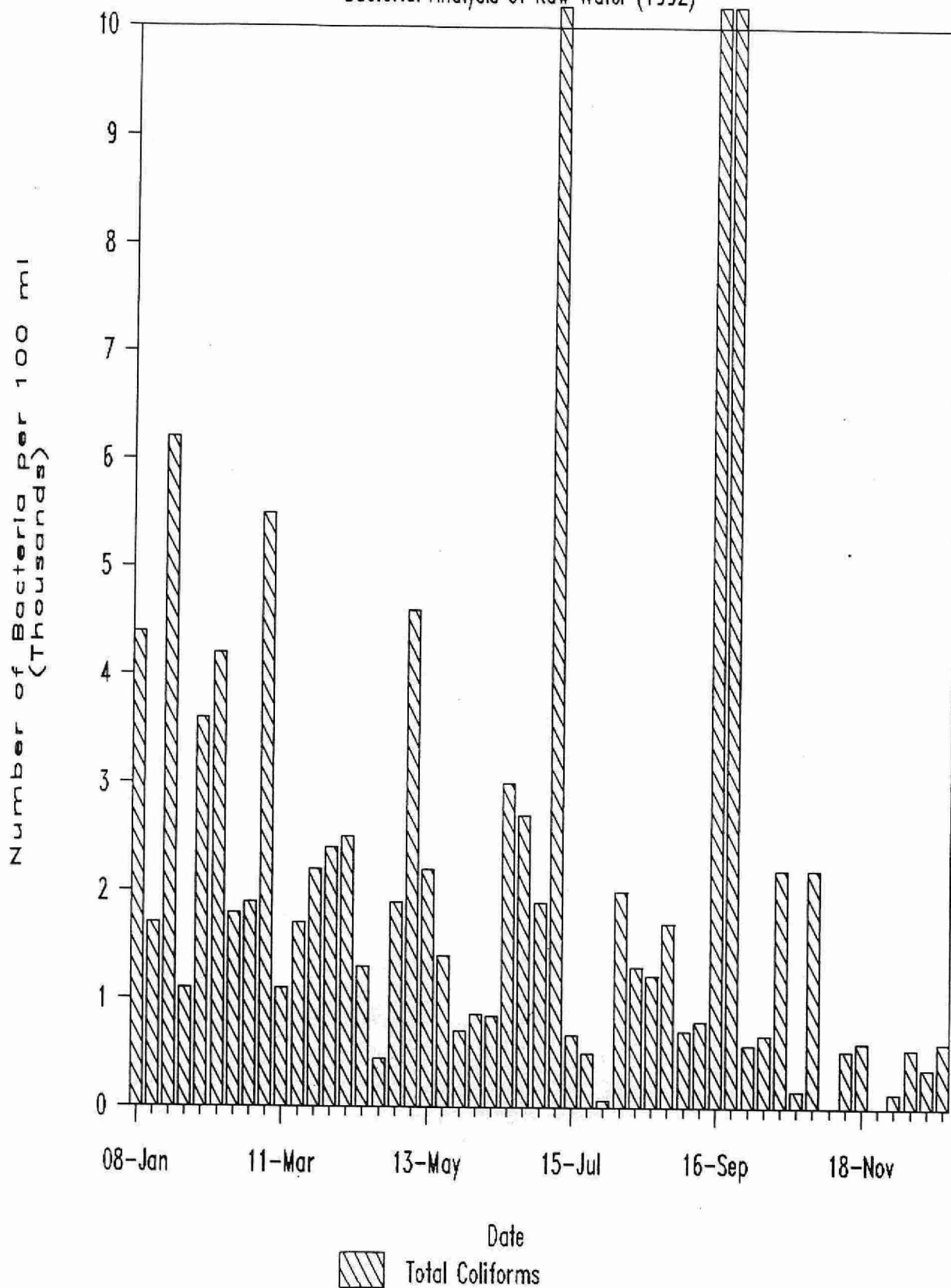
Bacterial Analysis of Raw Water (1992)



ROCKLAND

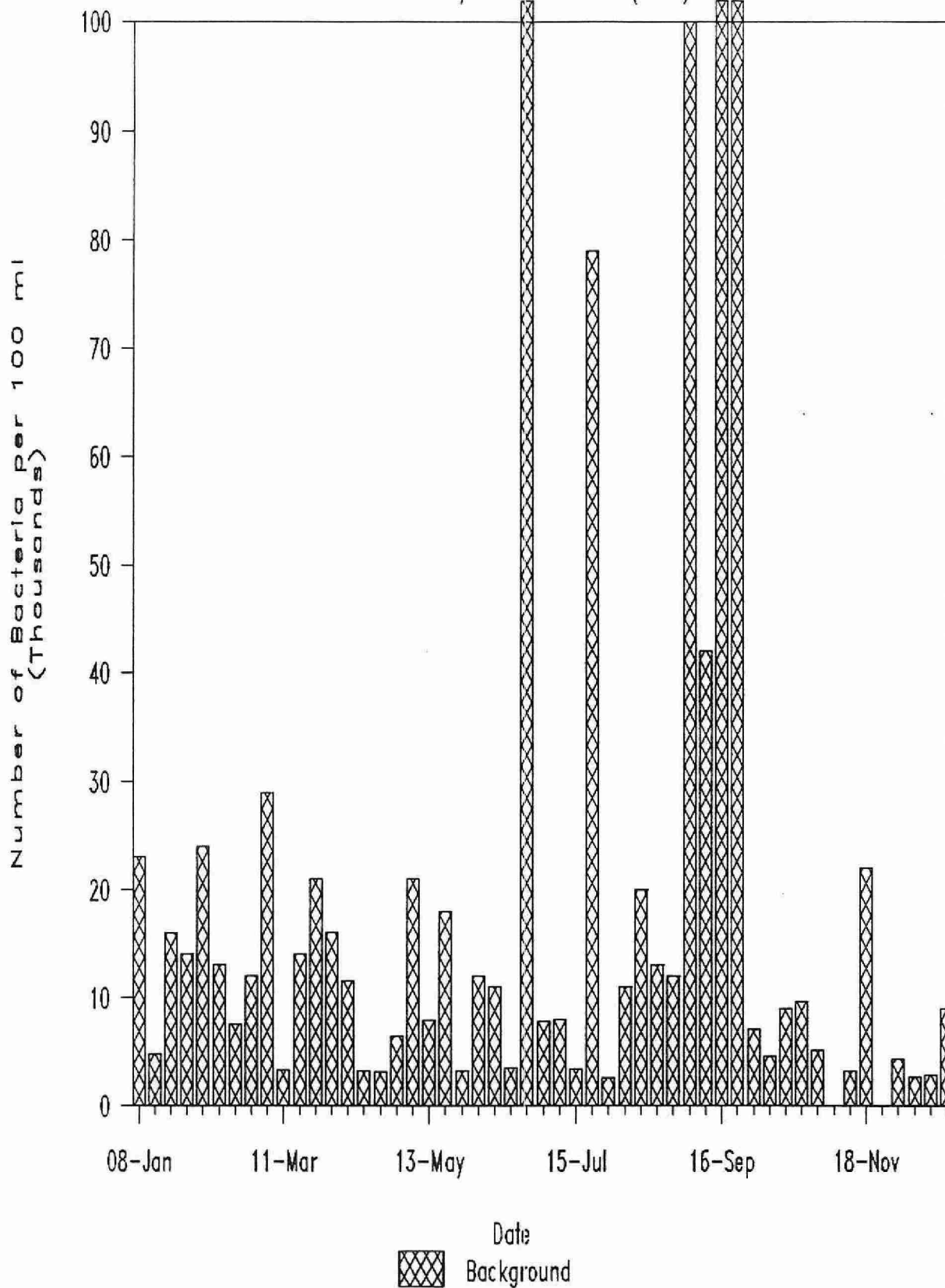
133

Bacterial Analysis of Raw Water (1992)



ROCKLAND

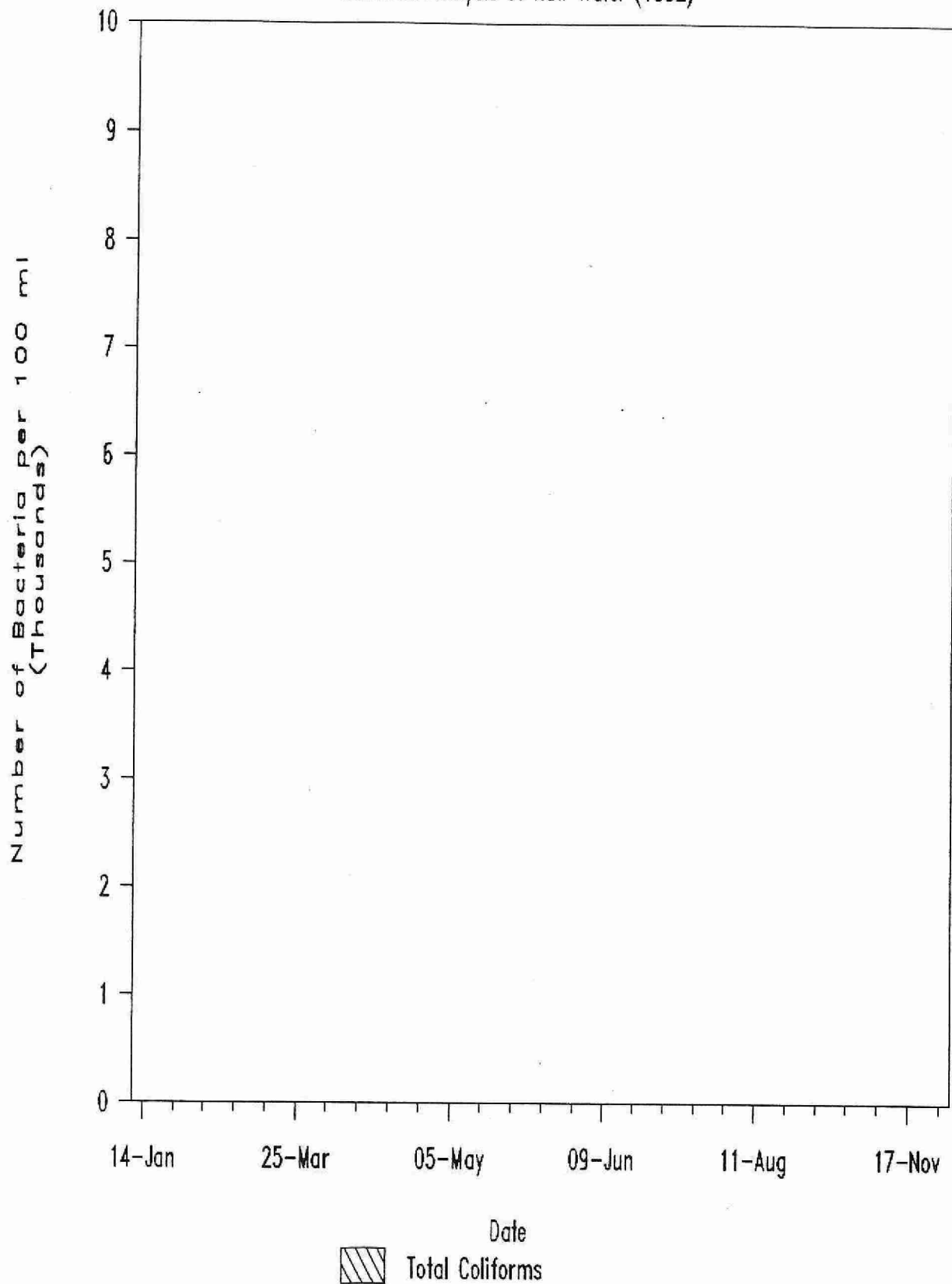
Bacterial Analysis of Raw Water (1992)



RUSSELL TWP (EMBRUN)

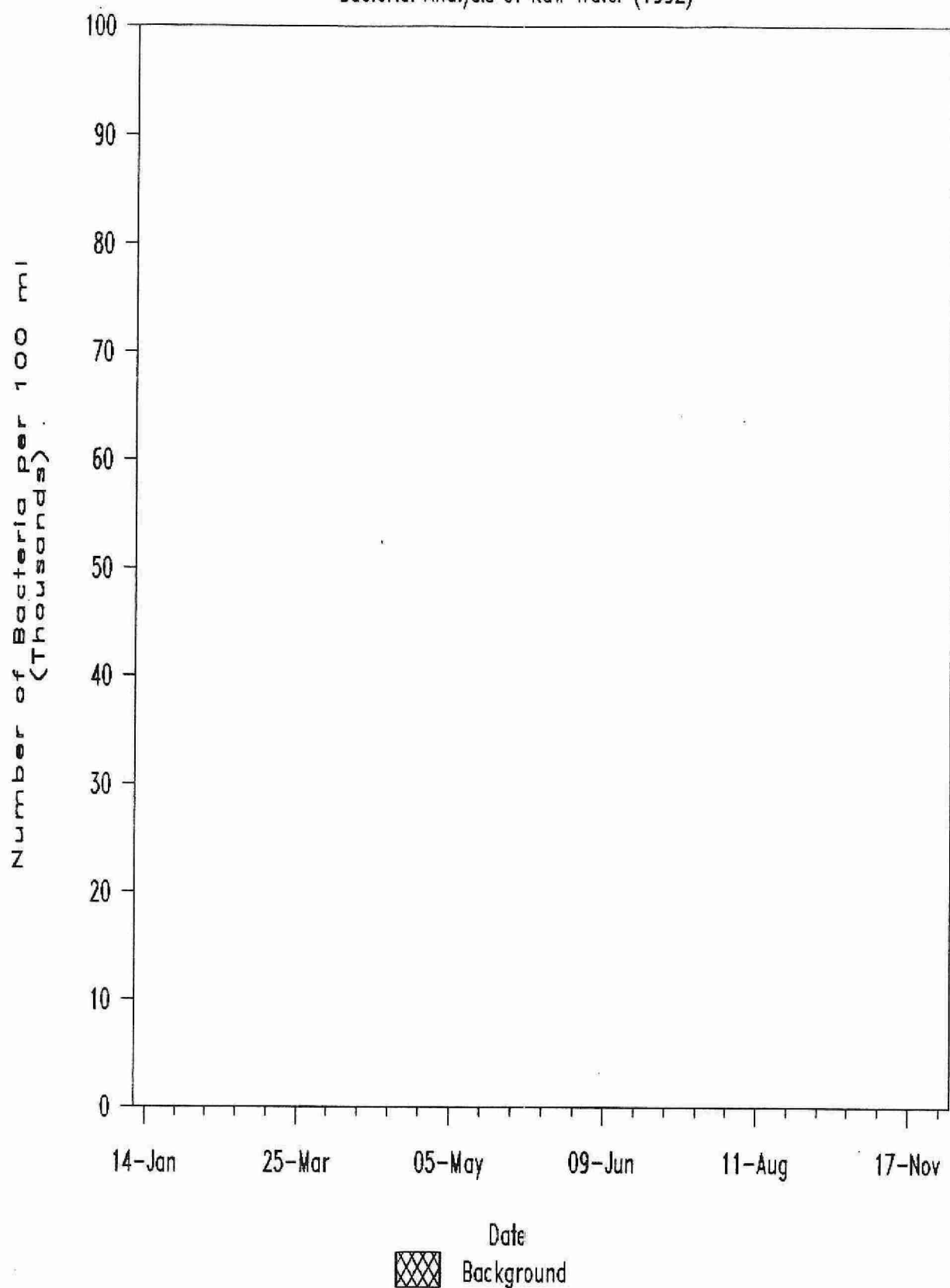
135

Bacterial Analysis of Raw Water (1992)



RUSSELL TWP (EMBRUN)

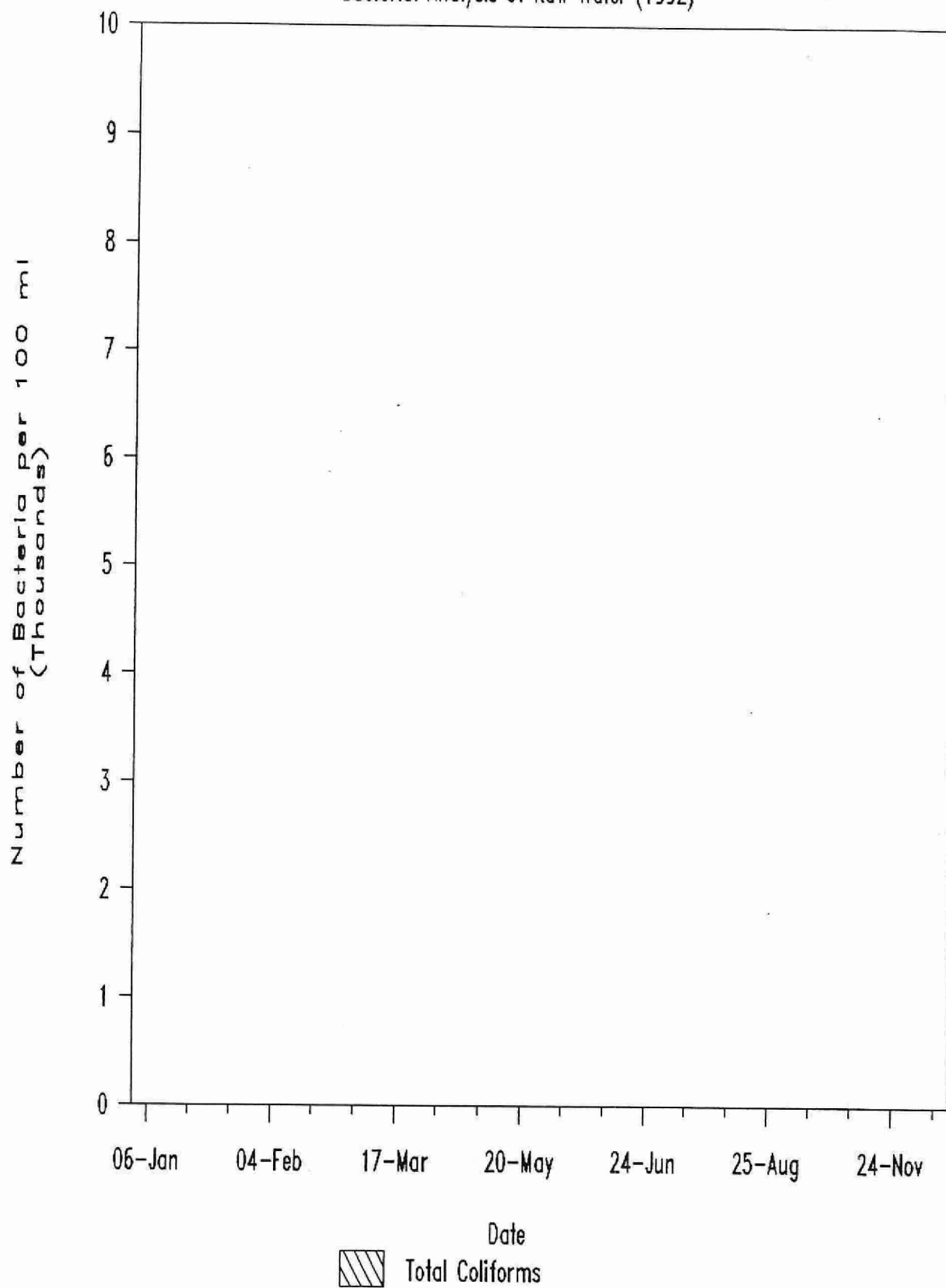
Bacterial Analysis of Raw Water (1992)



RUSSELL TWP (RUSSELL)

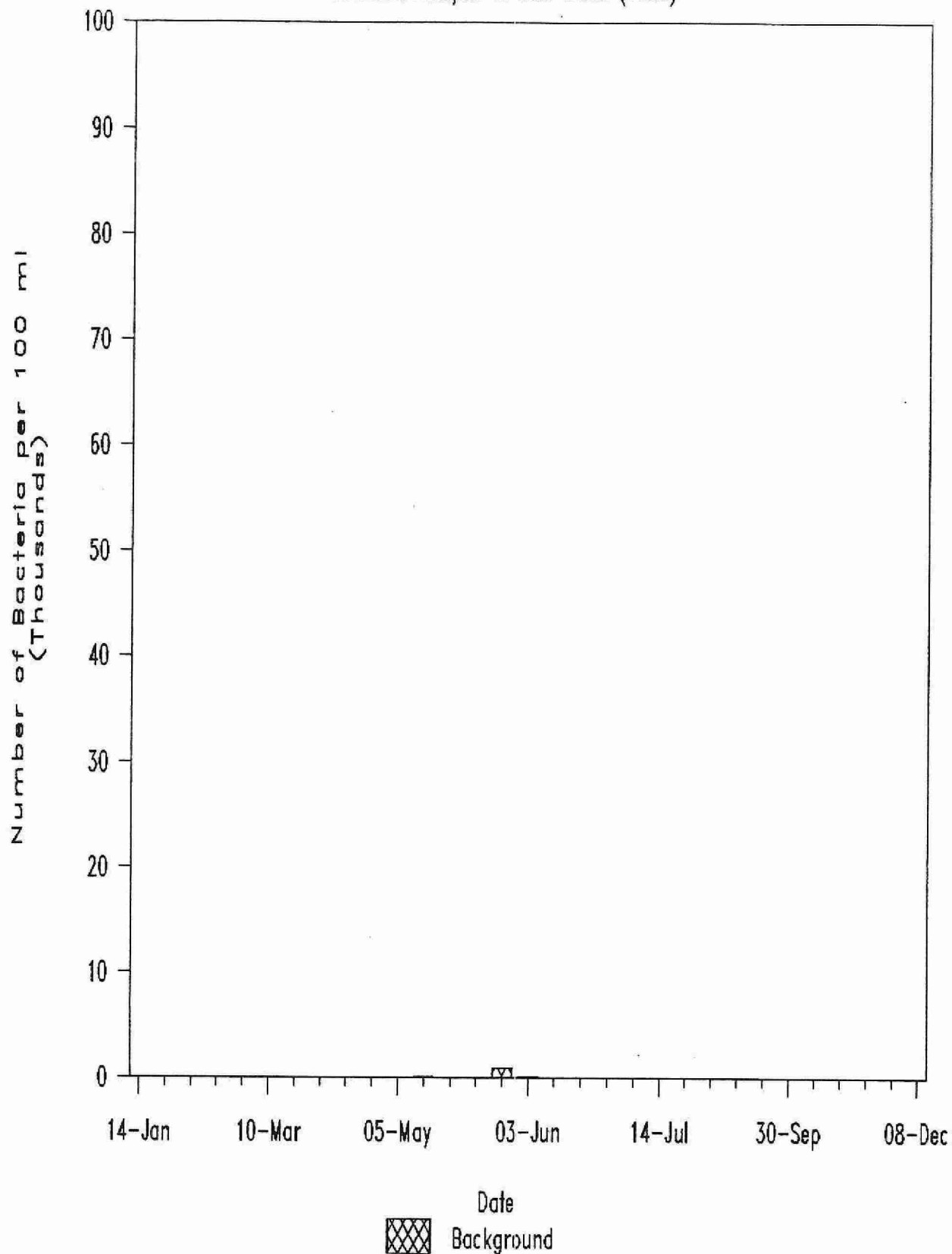
137

Bacterial Analysis of Raw Water (1992)



RUSSELL TWP (RUSSELL)

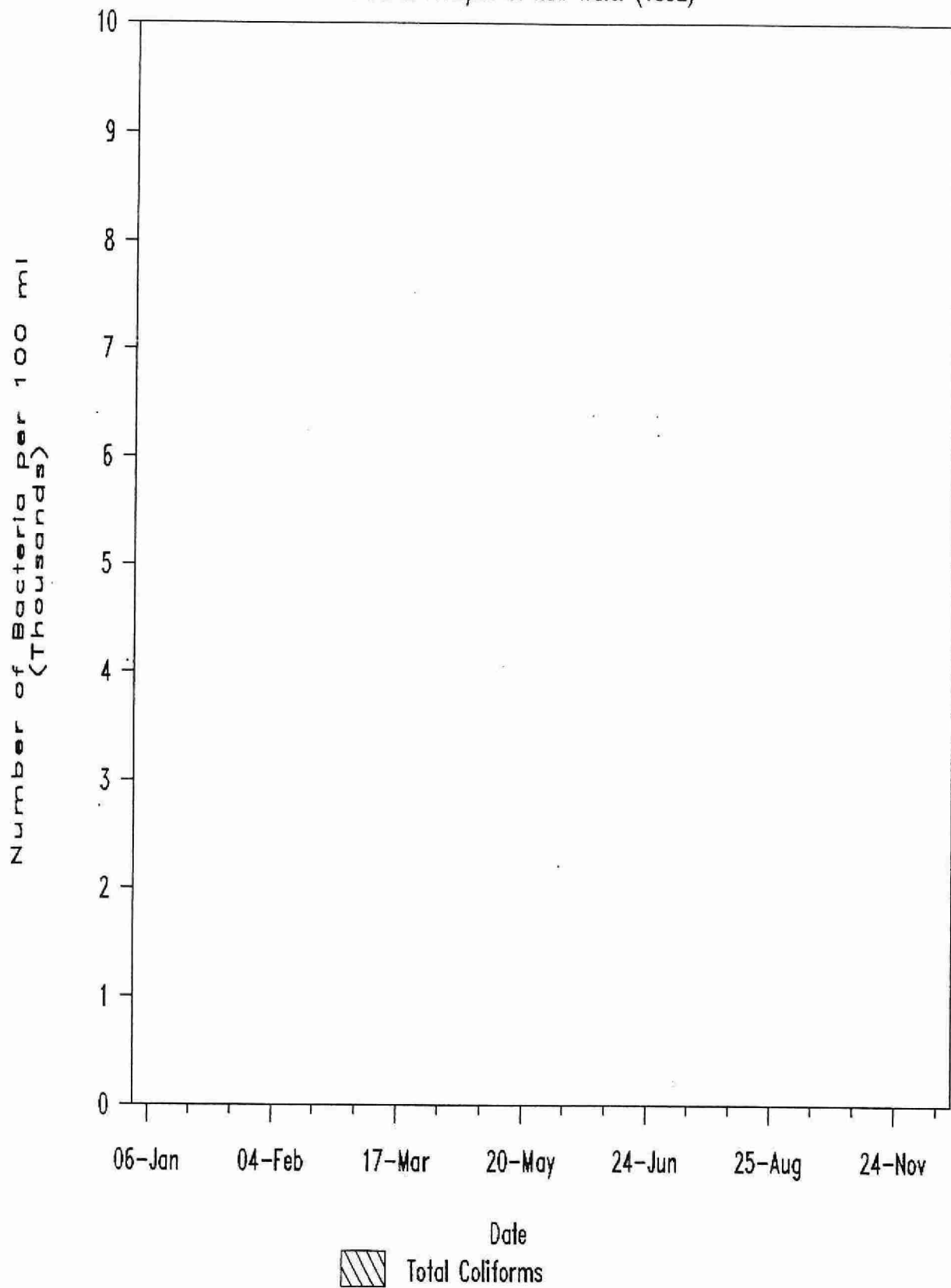
Bacterial Analysis of Raw Water (1992)



RUSSELL TWP (THERESE)

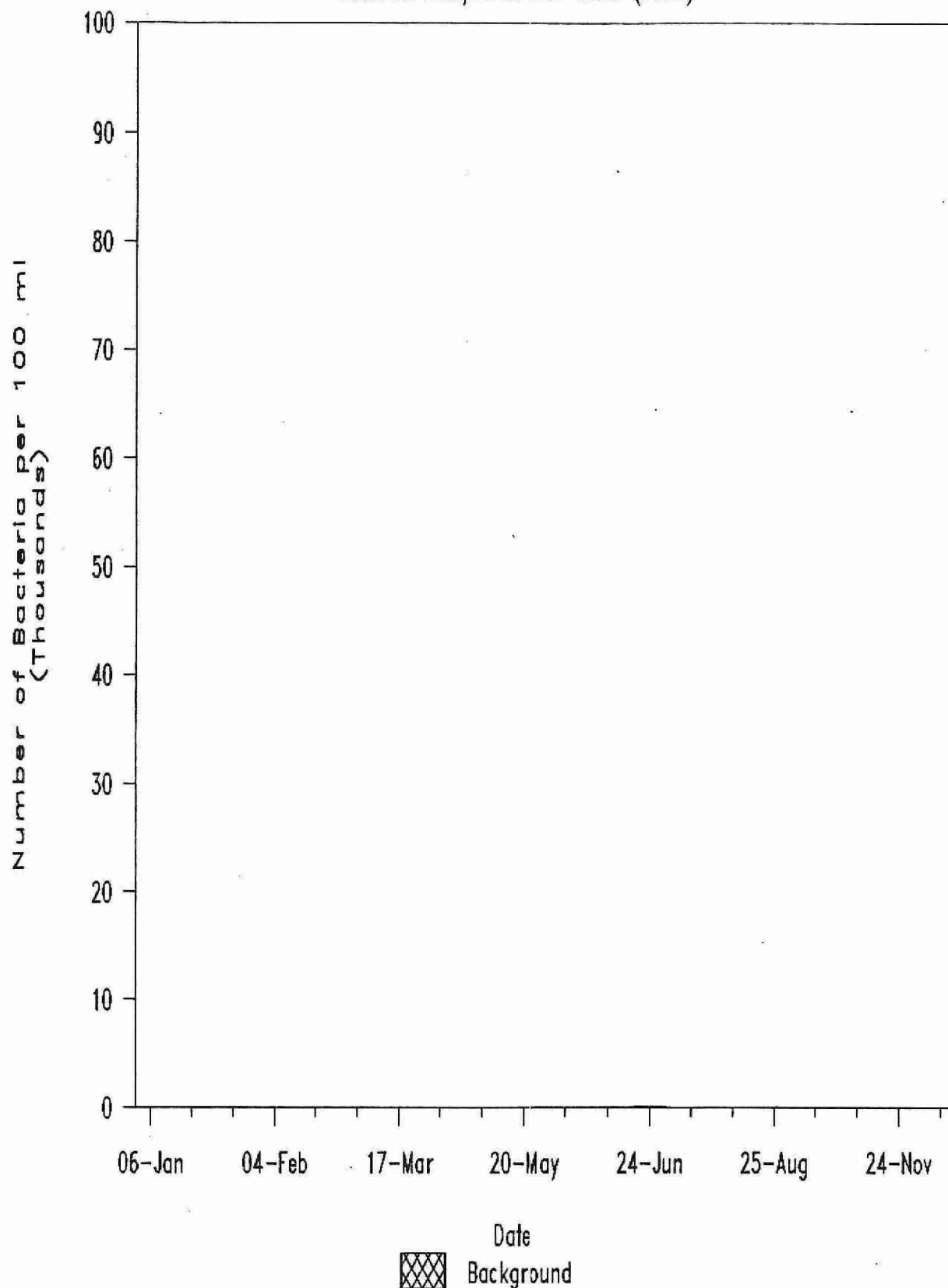
139

Bacterial Analysis of Raw Water (1992)



RUSSELL TWP (THERESE)

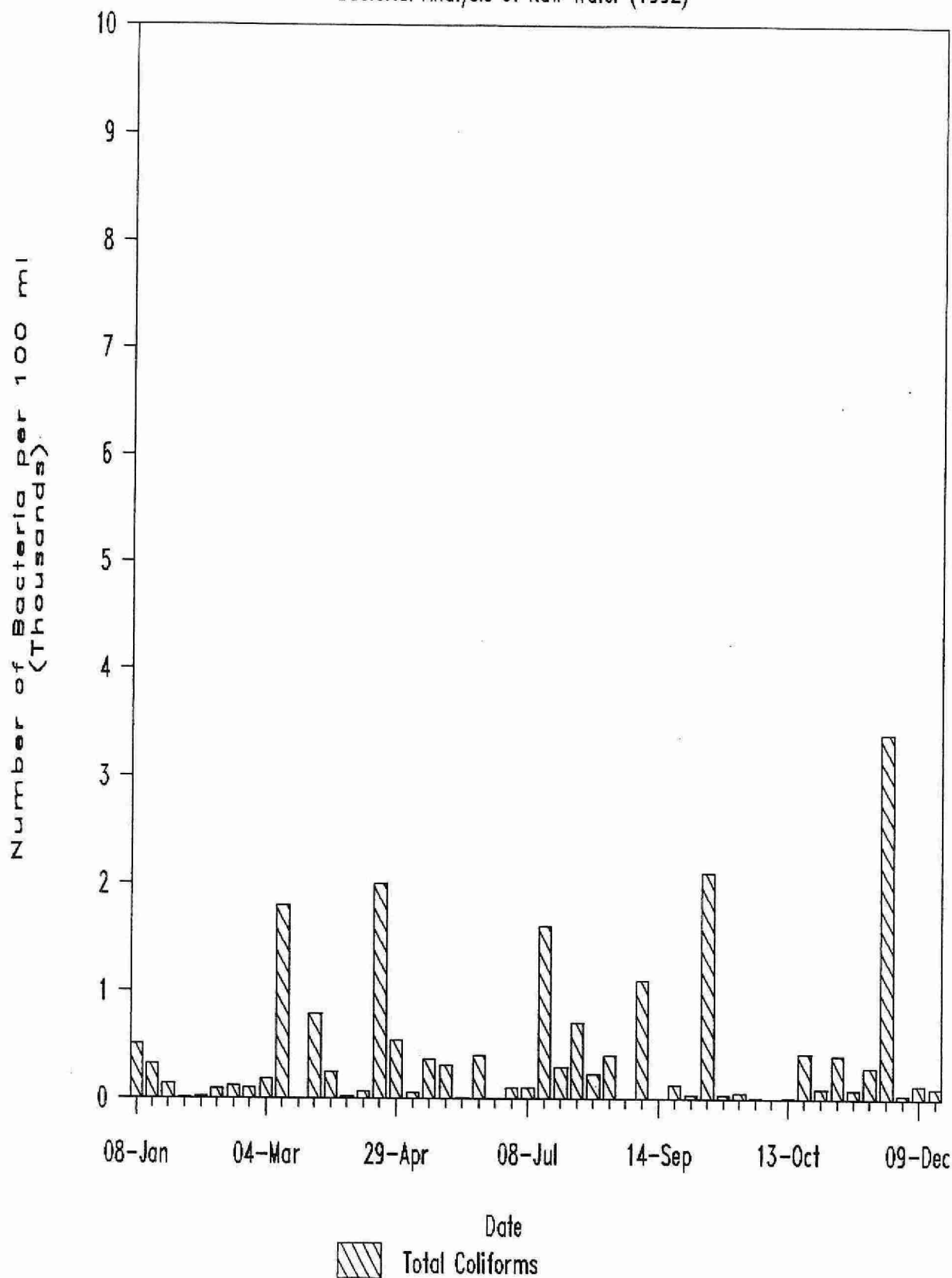
Bacterial Analysis of Raw Water (1992)



SIDNEY (BATAWA)

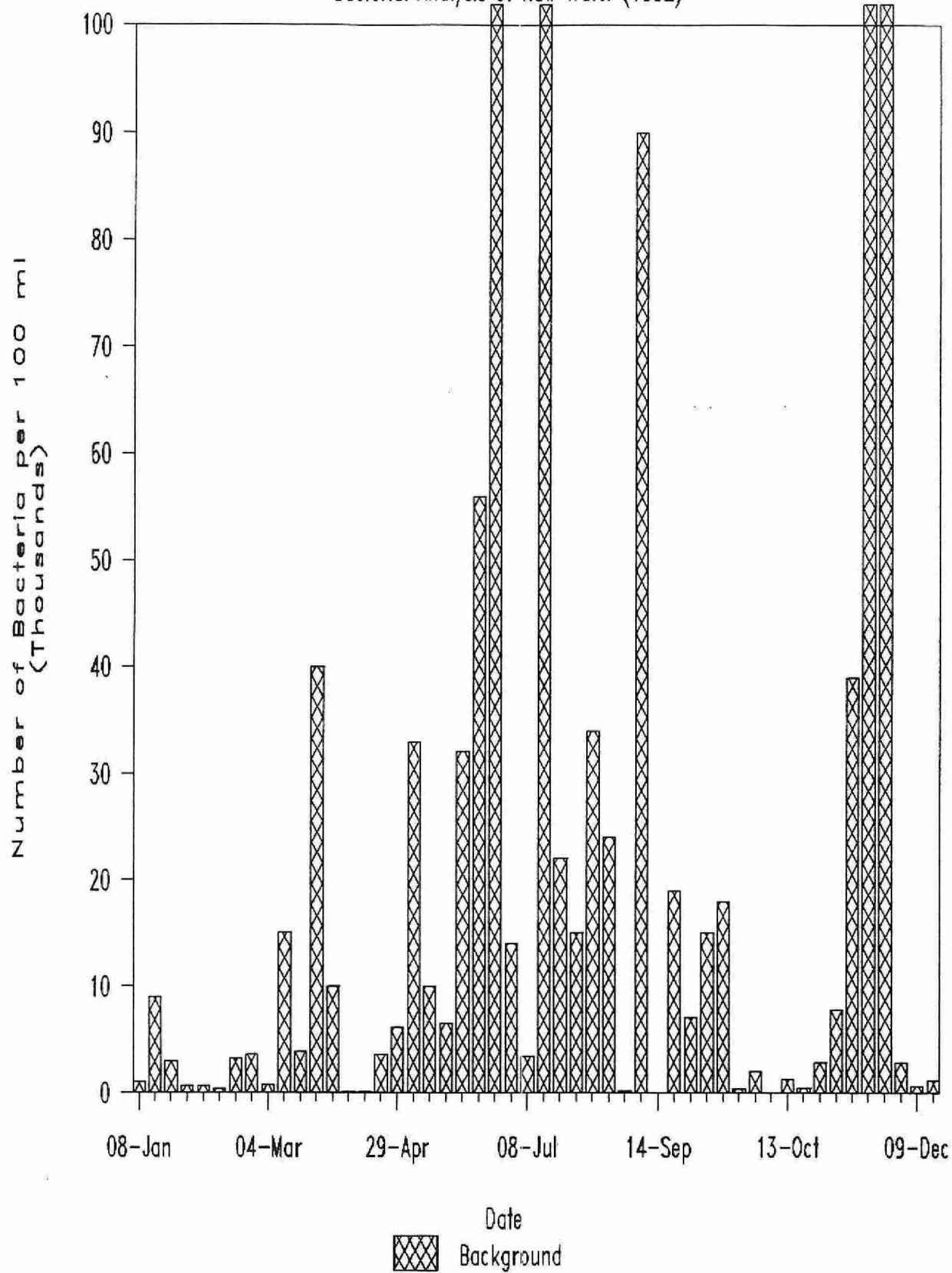
141

Bacterial Analysis of Raw Water (1992)



SIDNEY (BATAWA)

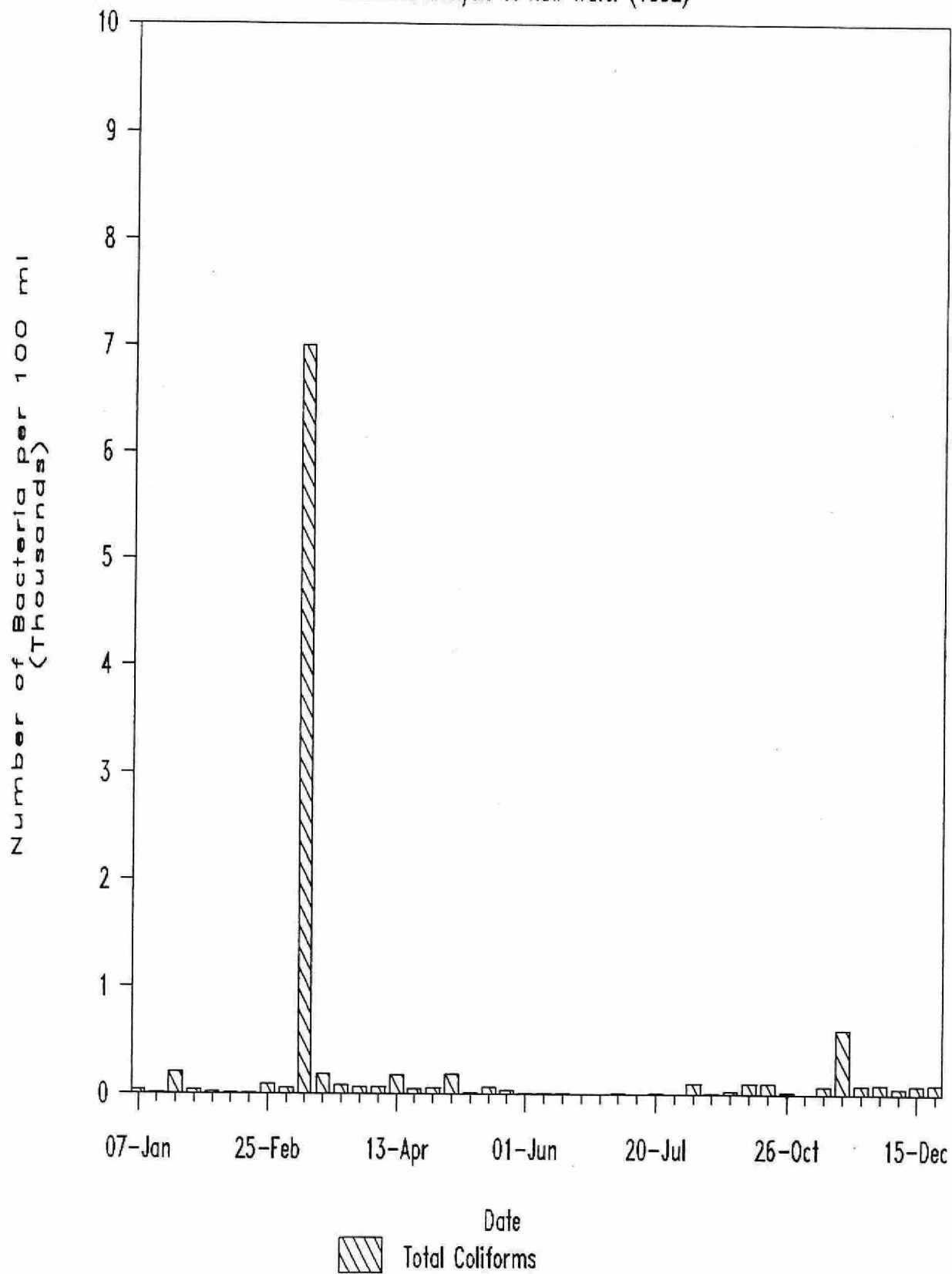
Bacterial Analysis of Raw Water (1992)



SIDNEY (BAYSIDE SCHOOL)

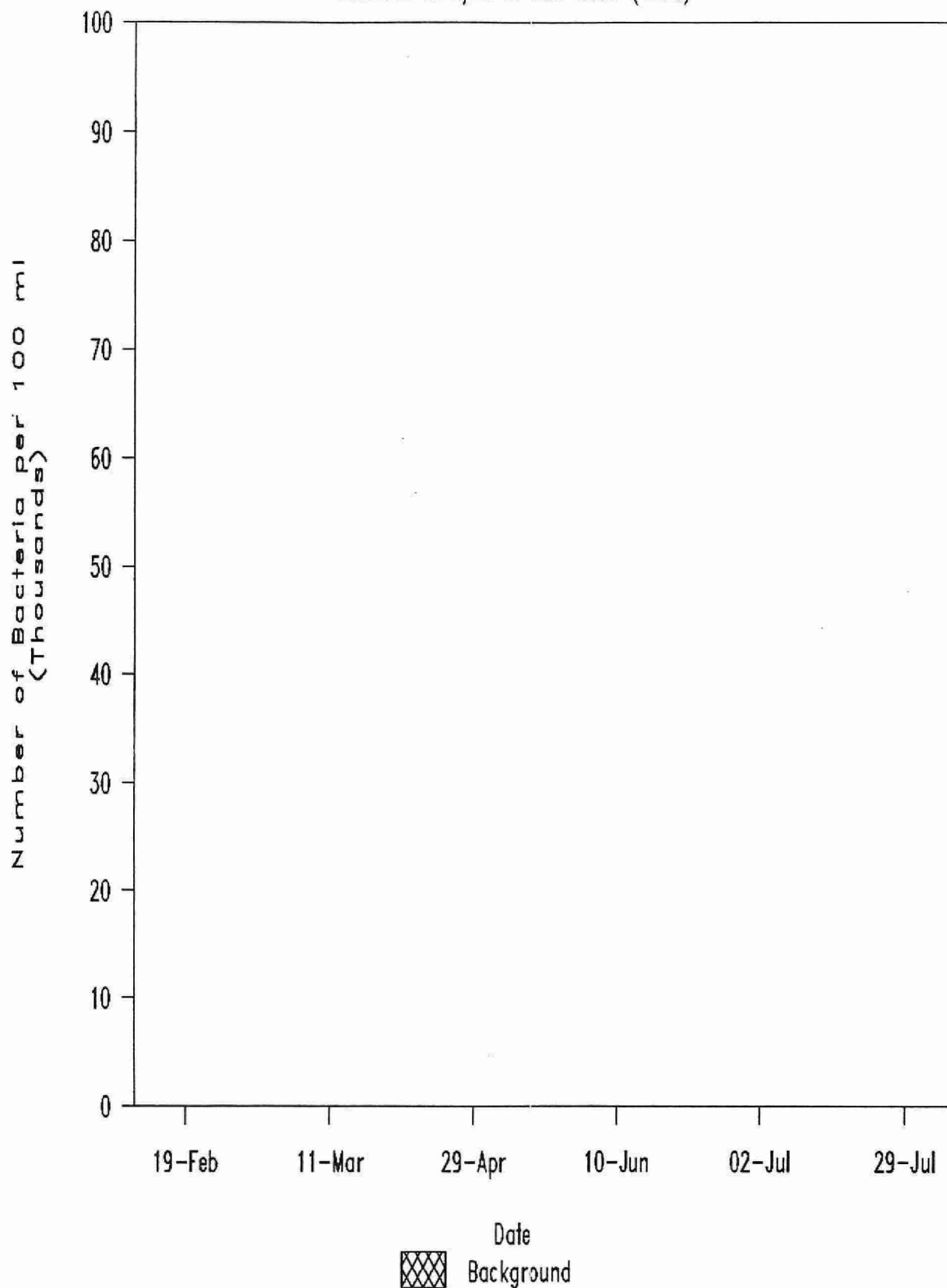
143

Bacterial Analysis of Raw Water (1992)



SIDNEY (BAYSIDE SCHOOL)

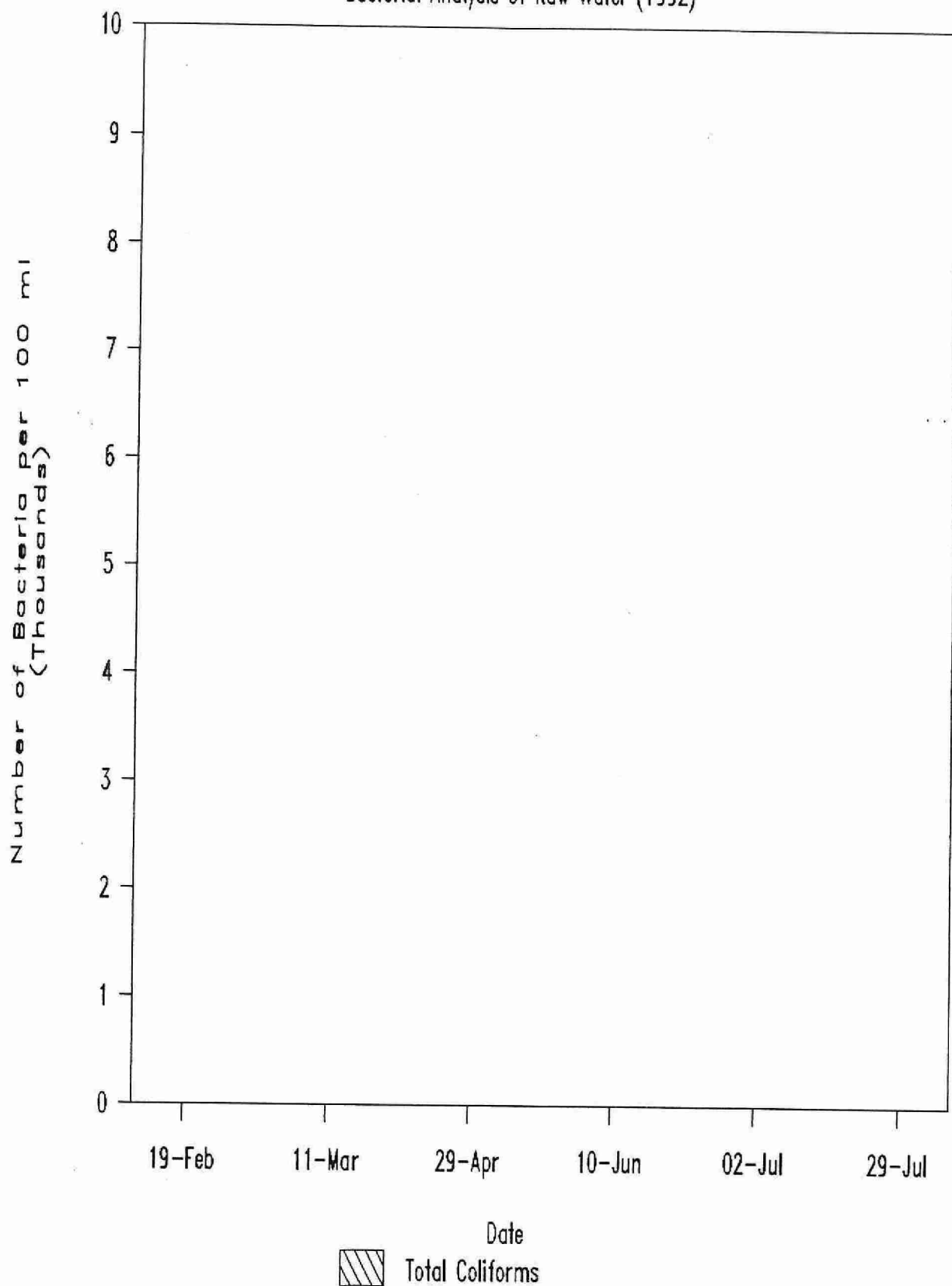
Bacterial Analysis of Raw Water (1992)



SIDNEY (BAYVIEW ESTATES)

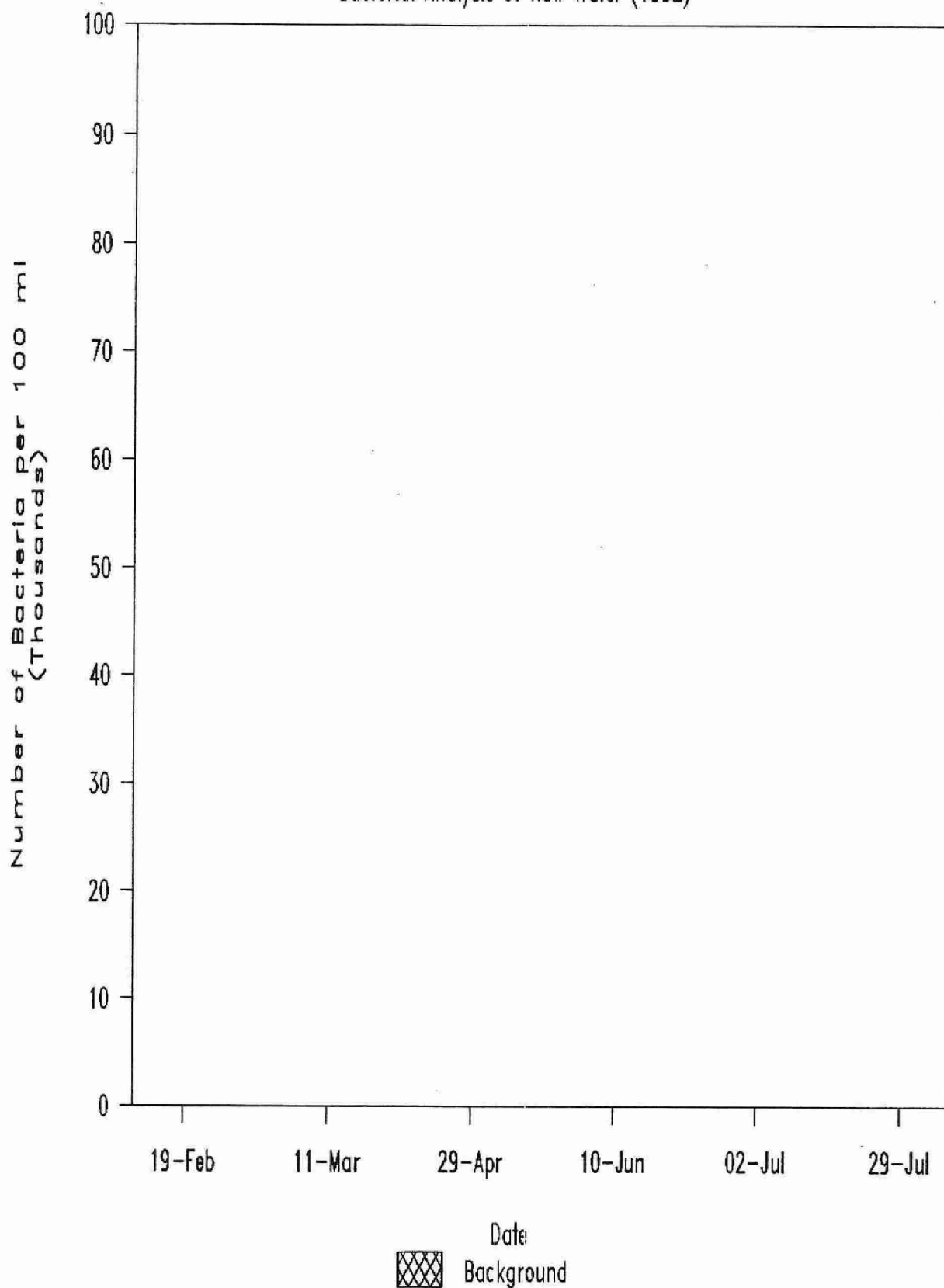
145

Bacterial Analysis of Raw Water (1992)



SIDNEY (BAYVIEW ESTATES)

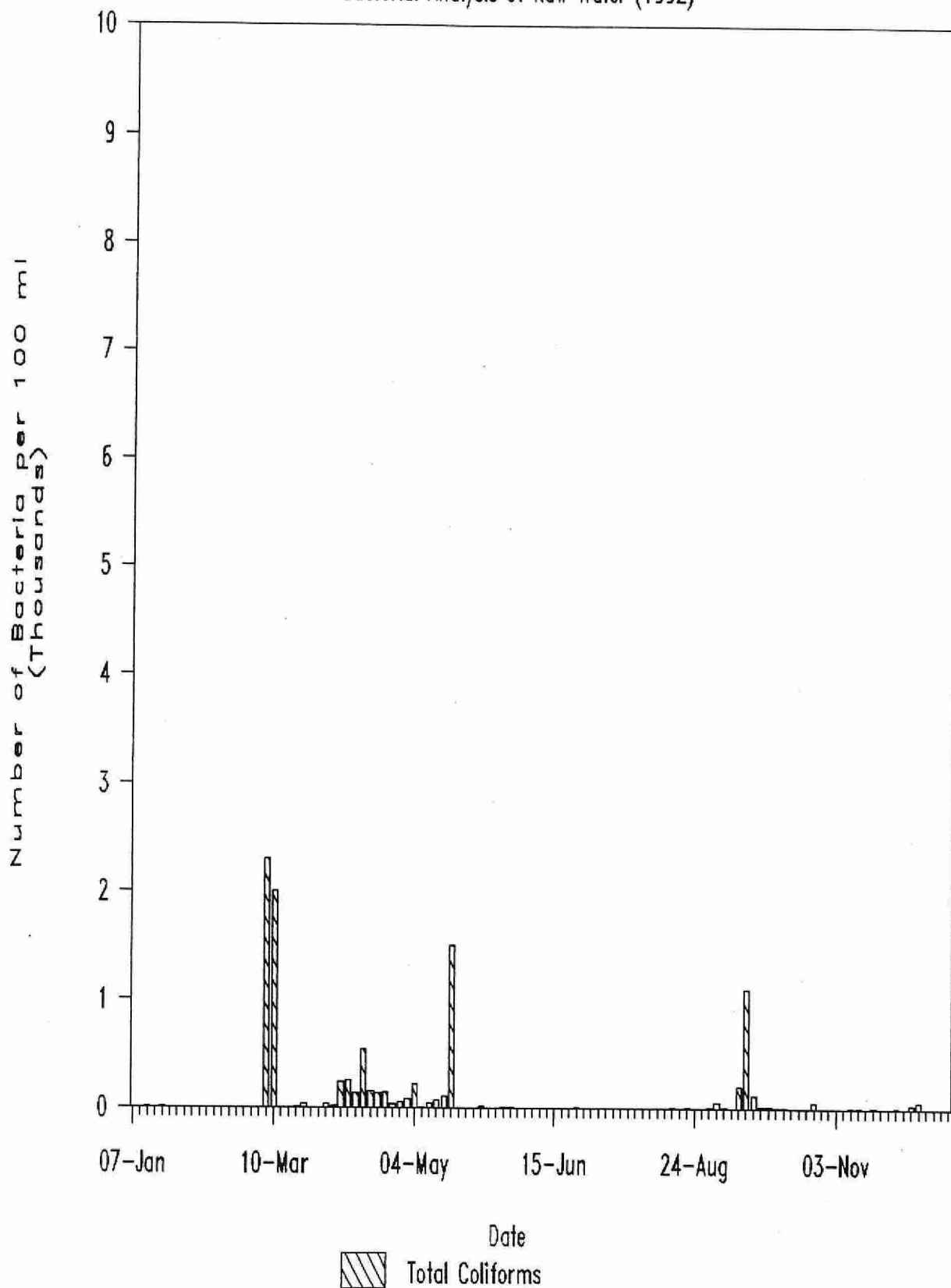
Bacterial Analysis of Raw Water (1992)



SIDNEY (COUNTRY CLUB VILLAGE)

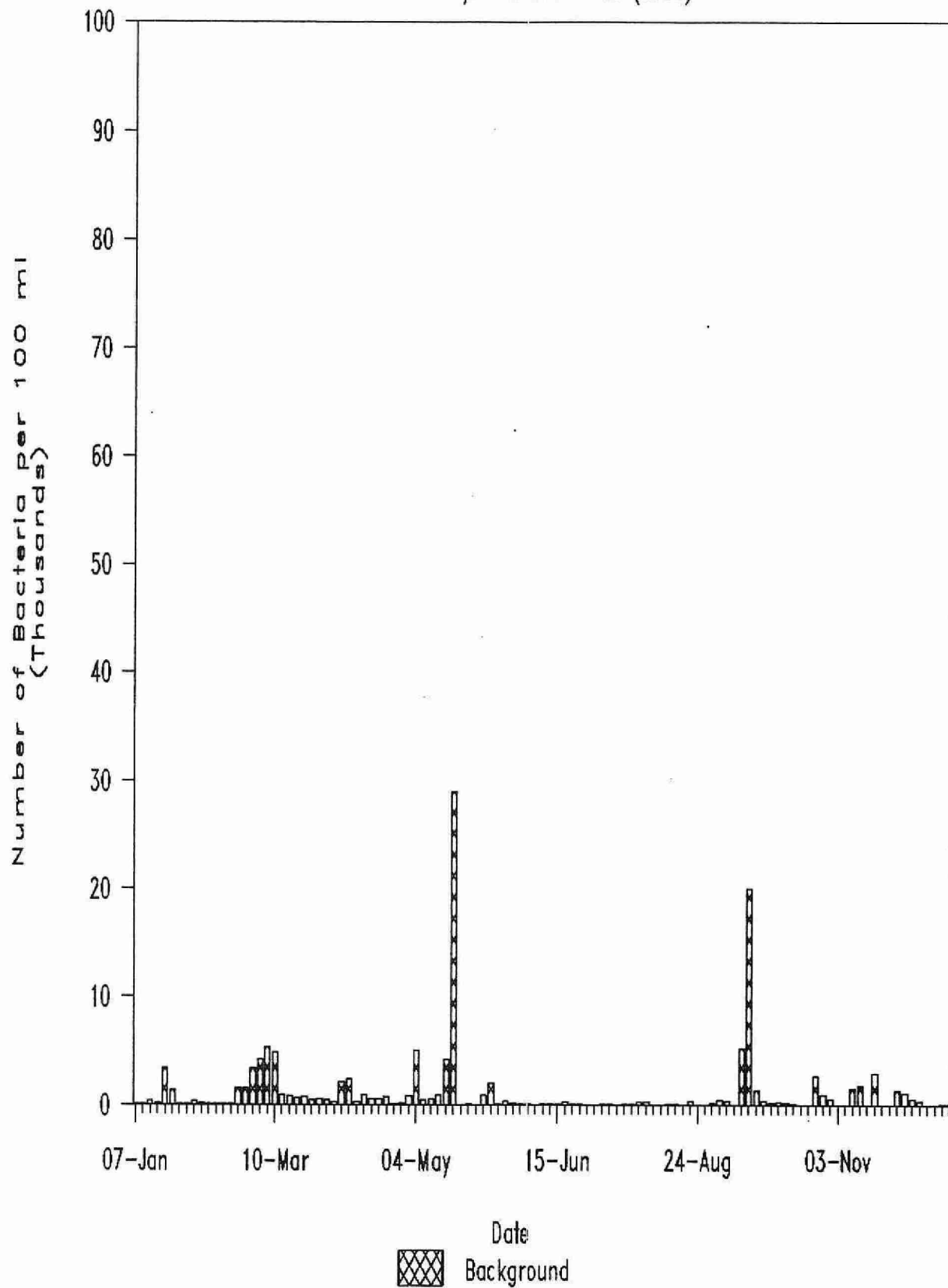
147

Bacterial Analysis of Raw Water (1992)



SIDNEY (COUNTRY CLUB VILLAGE)

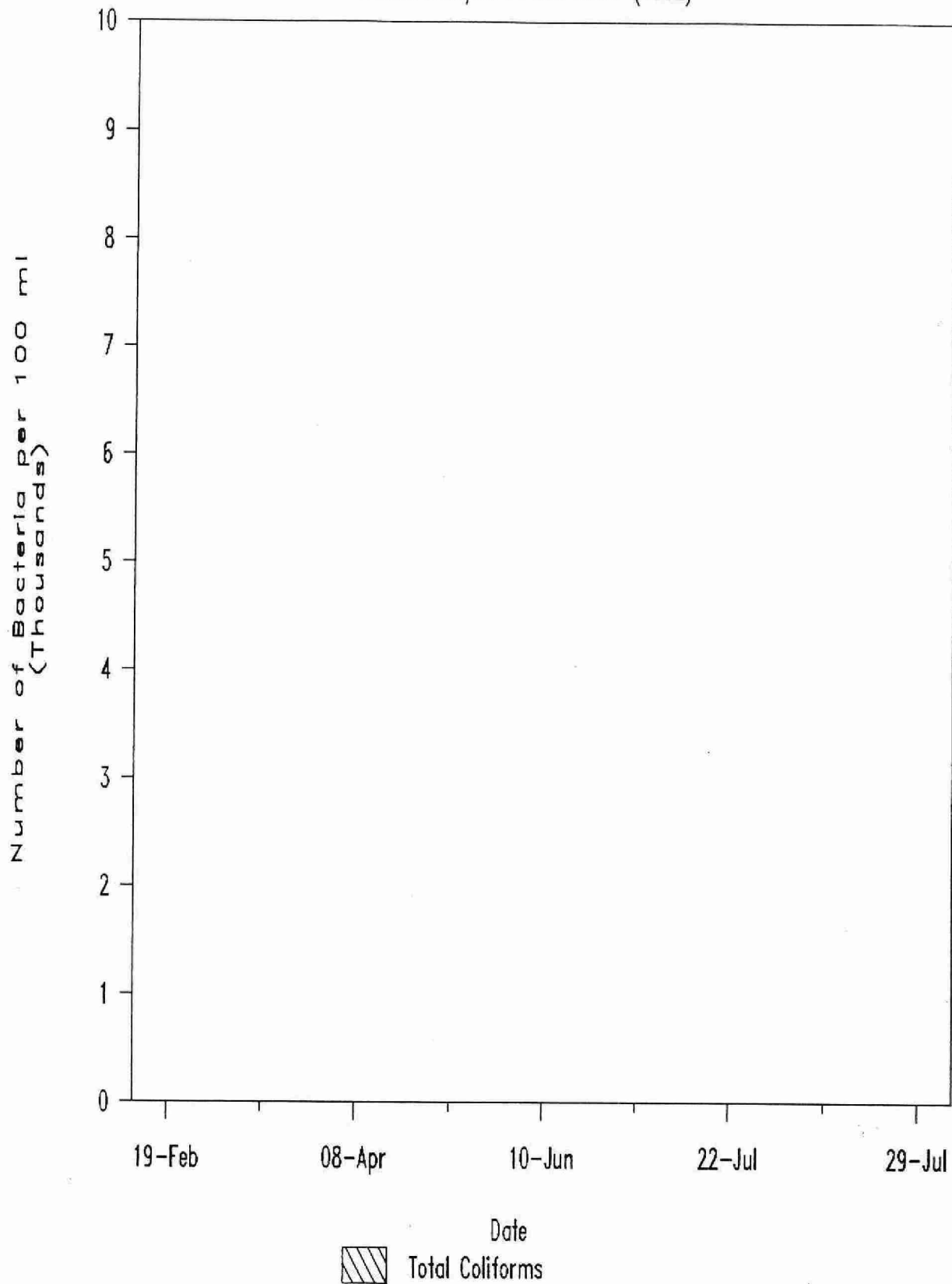
Bacterial Analysis of Raw Water (1992)



SIDNEY (KENRON ESTATES)

149

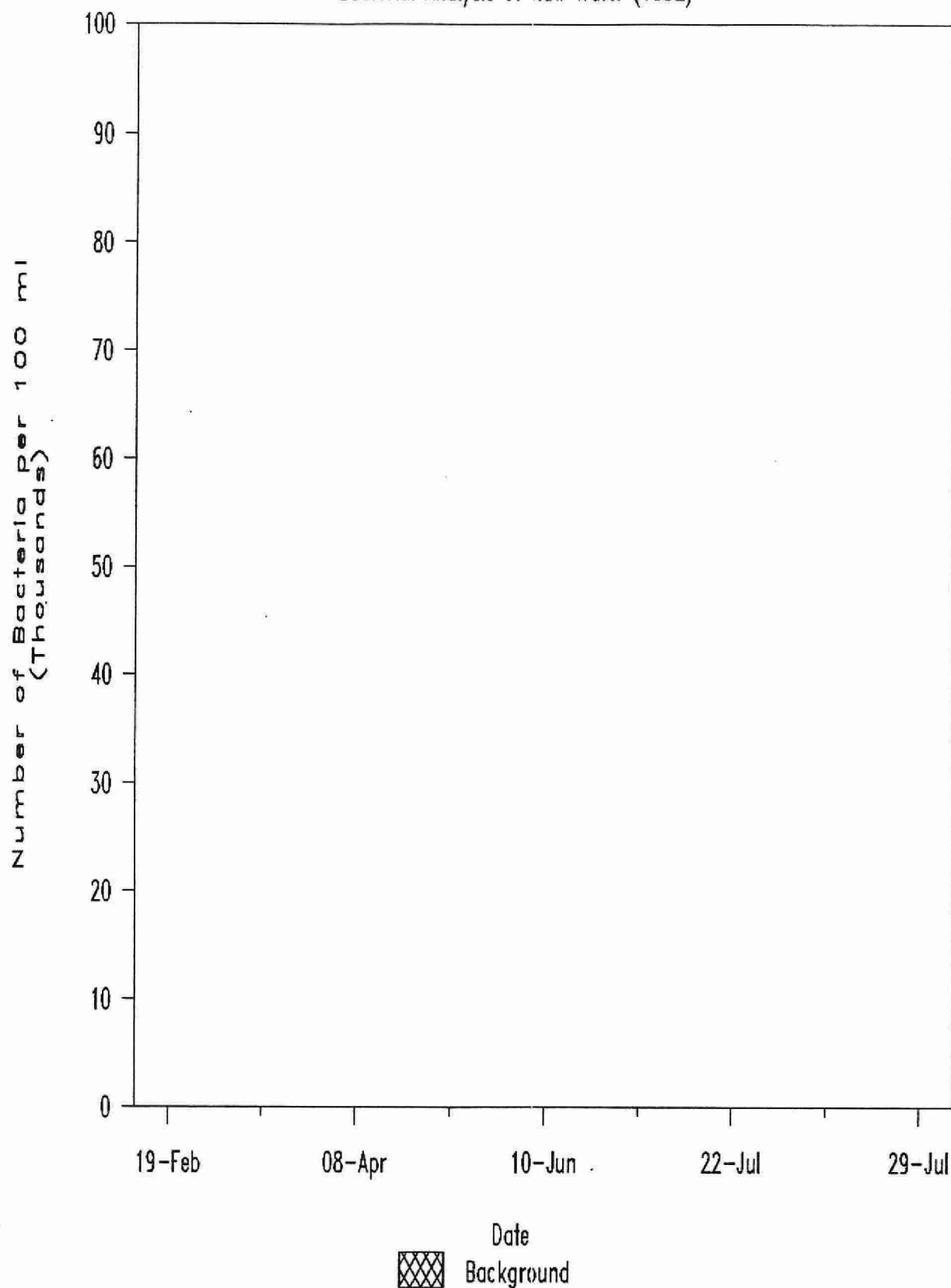
Bacterial Analysis of Raw Water (1992)



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SIDNEY (KENRON ESTATES)

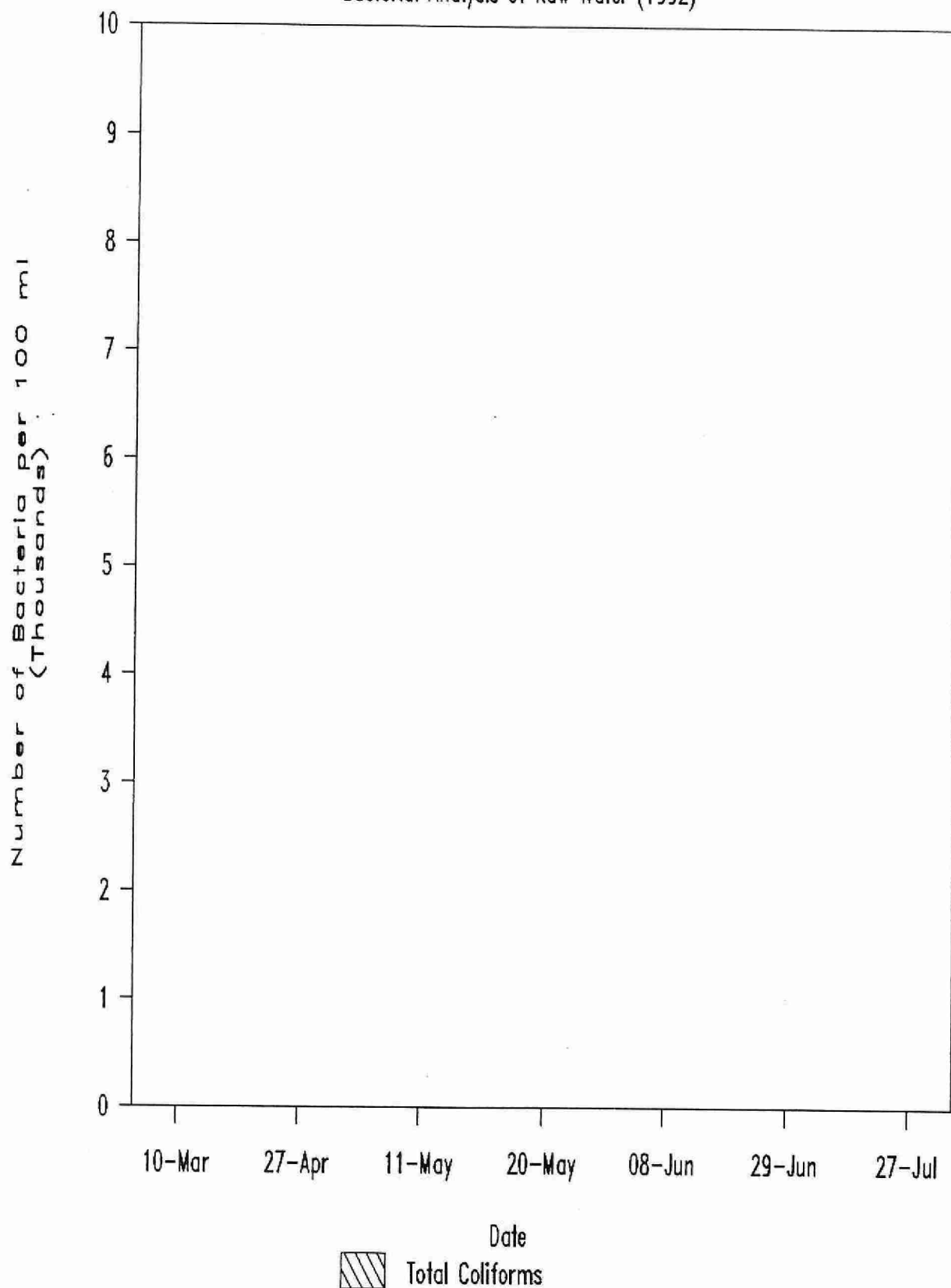
Bacterial Analysis of Raw Water (1992)



SIDNEY (QUINTE HEIGHTS)

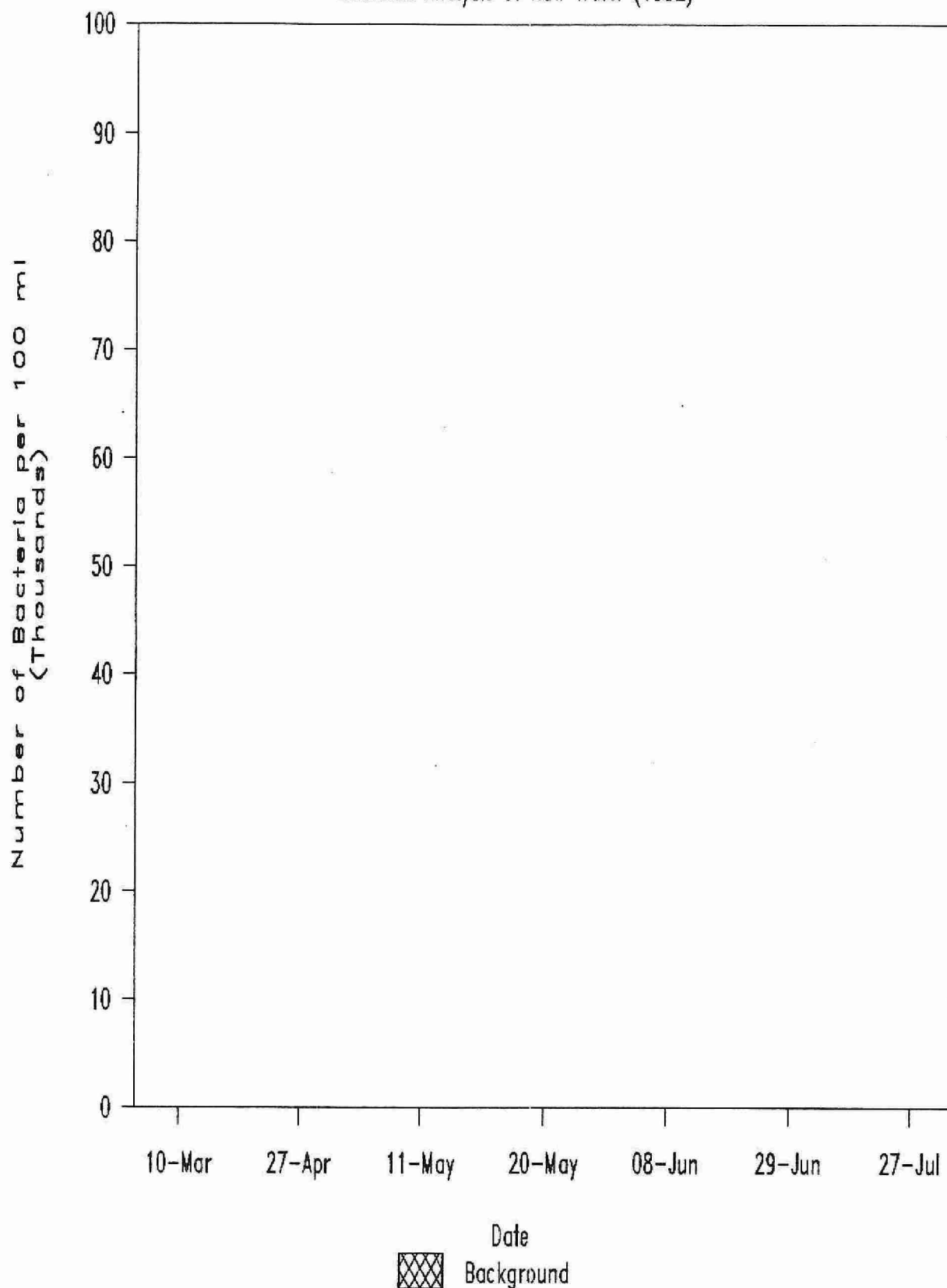
151

Bacterial Analysis of Raw Water (1992)



SIDNEY (QUINTE HEIGHTS)

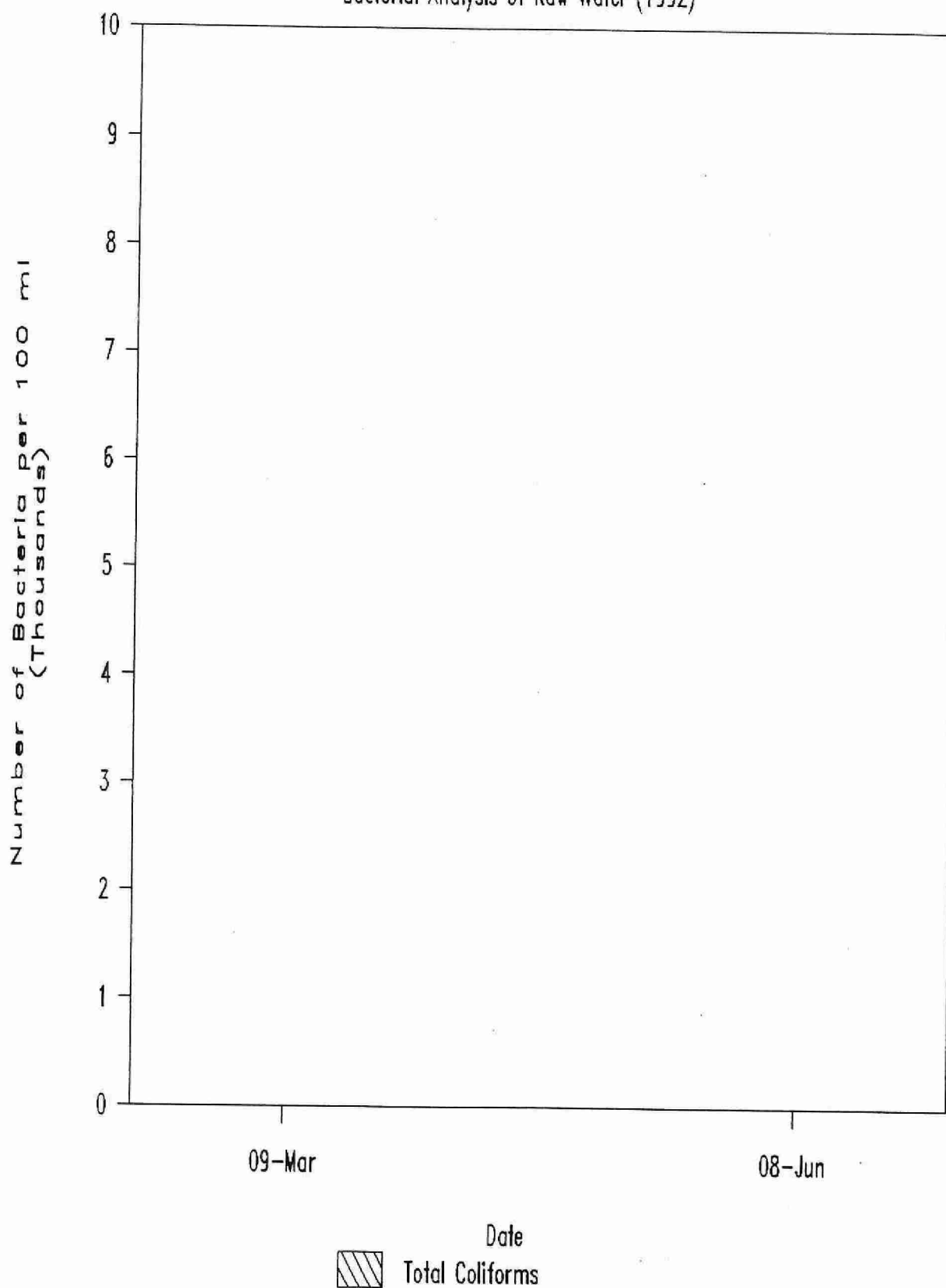
Bacterial Analysis of Raw Water (1992)



SMITHS FALLS

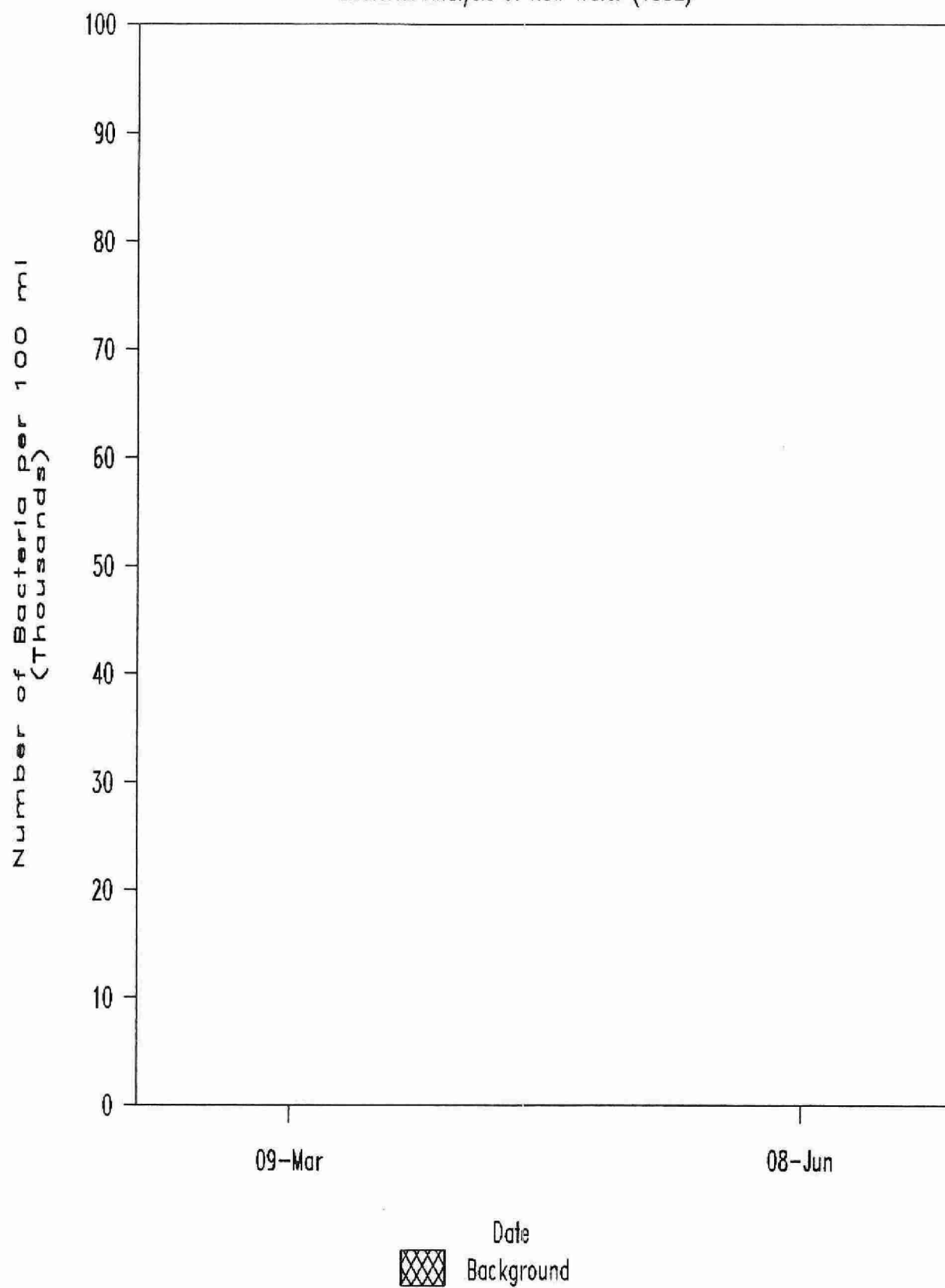
153

Bacterial Analysis of Raw Water (1992)



SMITHS FALLS

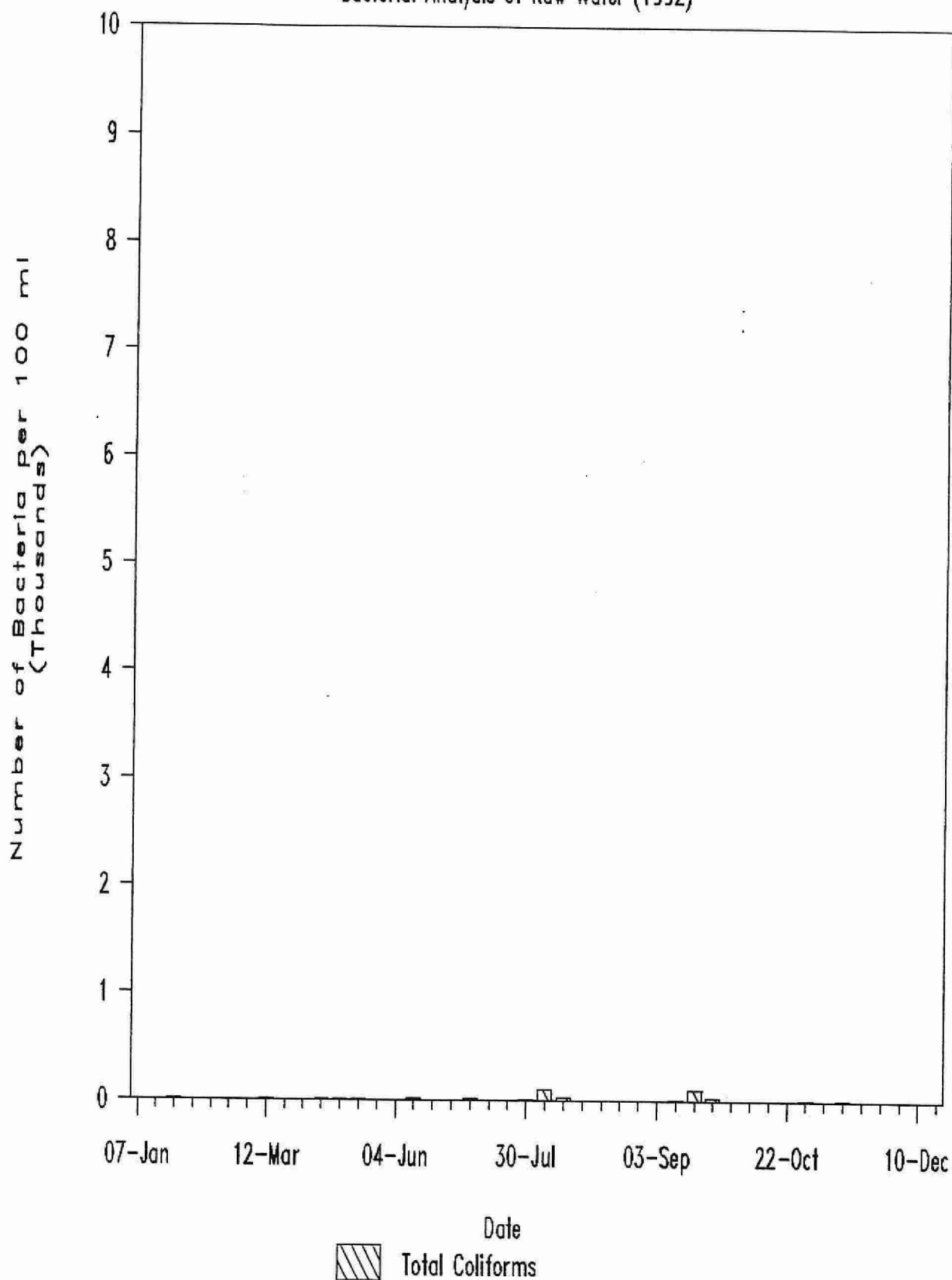
Bacterial Analysis of Raw Water (1992)



S FREDERICKSBURGH (SANDHURST SHORES)

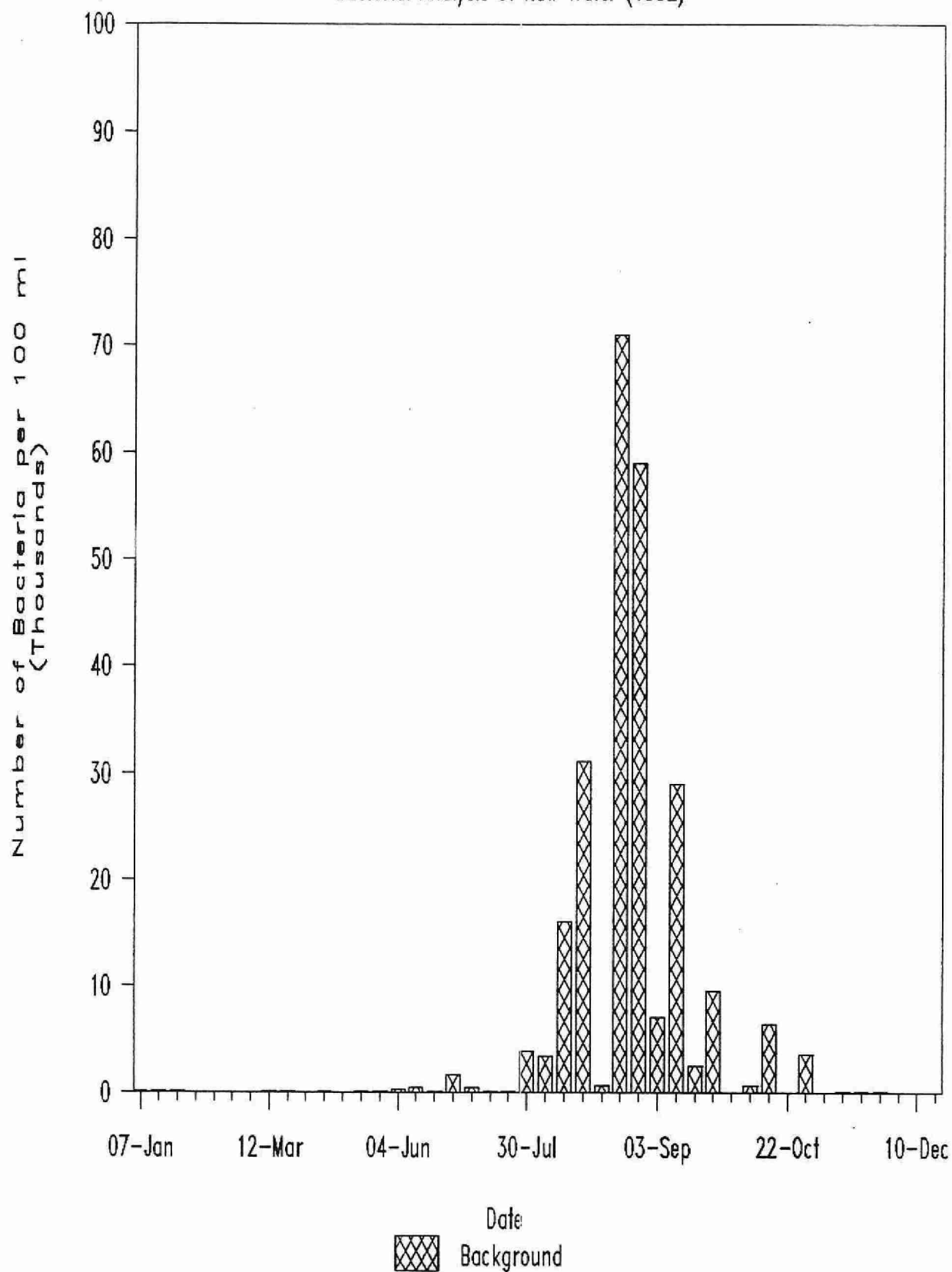
155

Bacterial Analysis of Raw Water (1992)



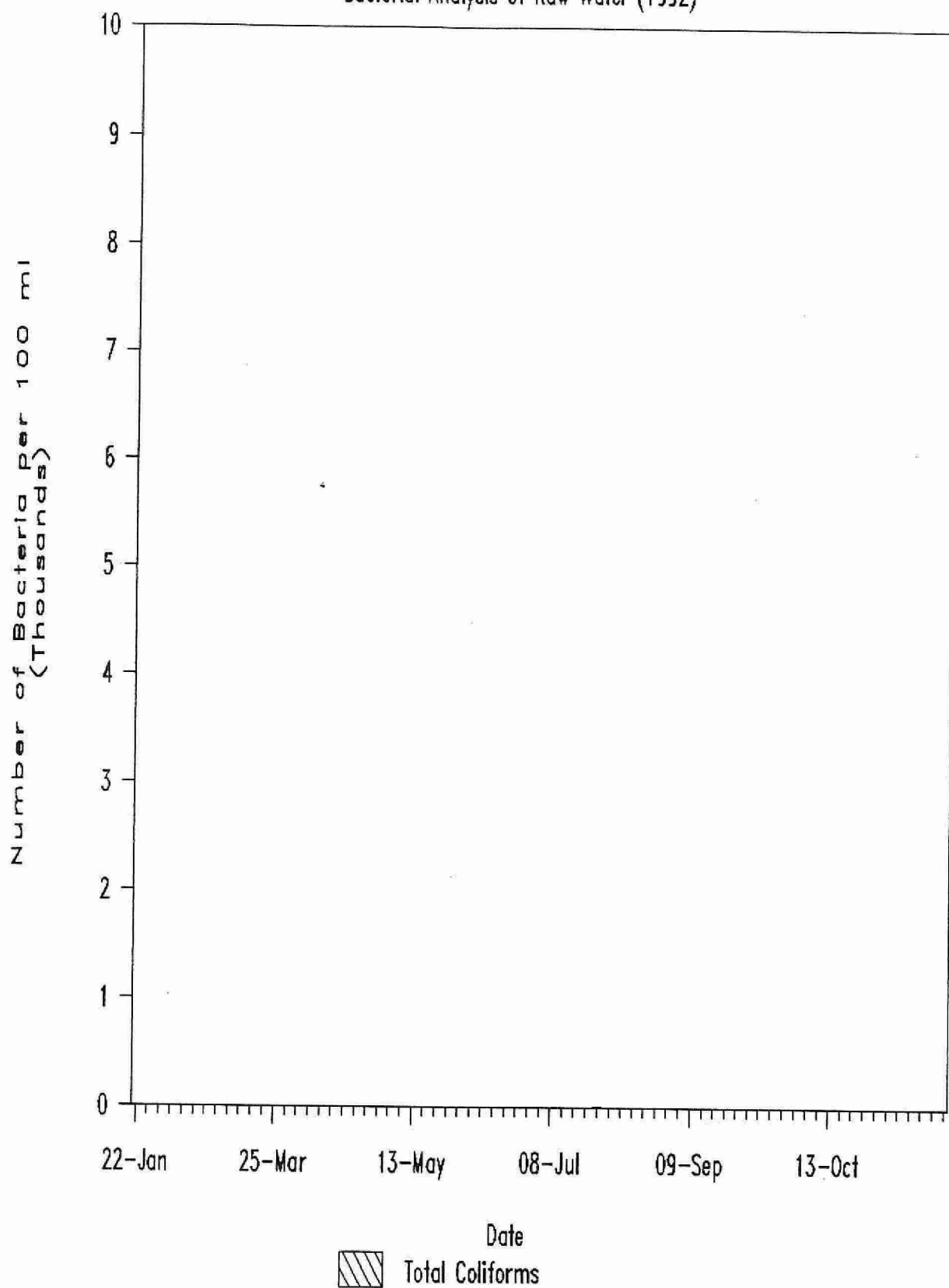
S FREDERICKSBURGH (SANDHURST SHORES)

Bacterial Analysis of Raw Water (1992)



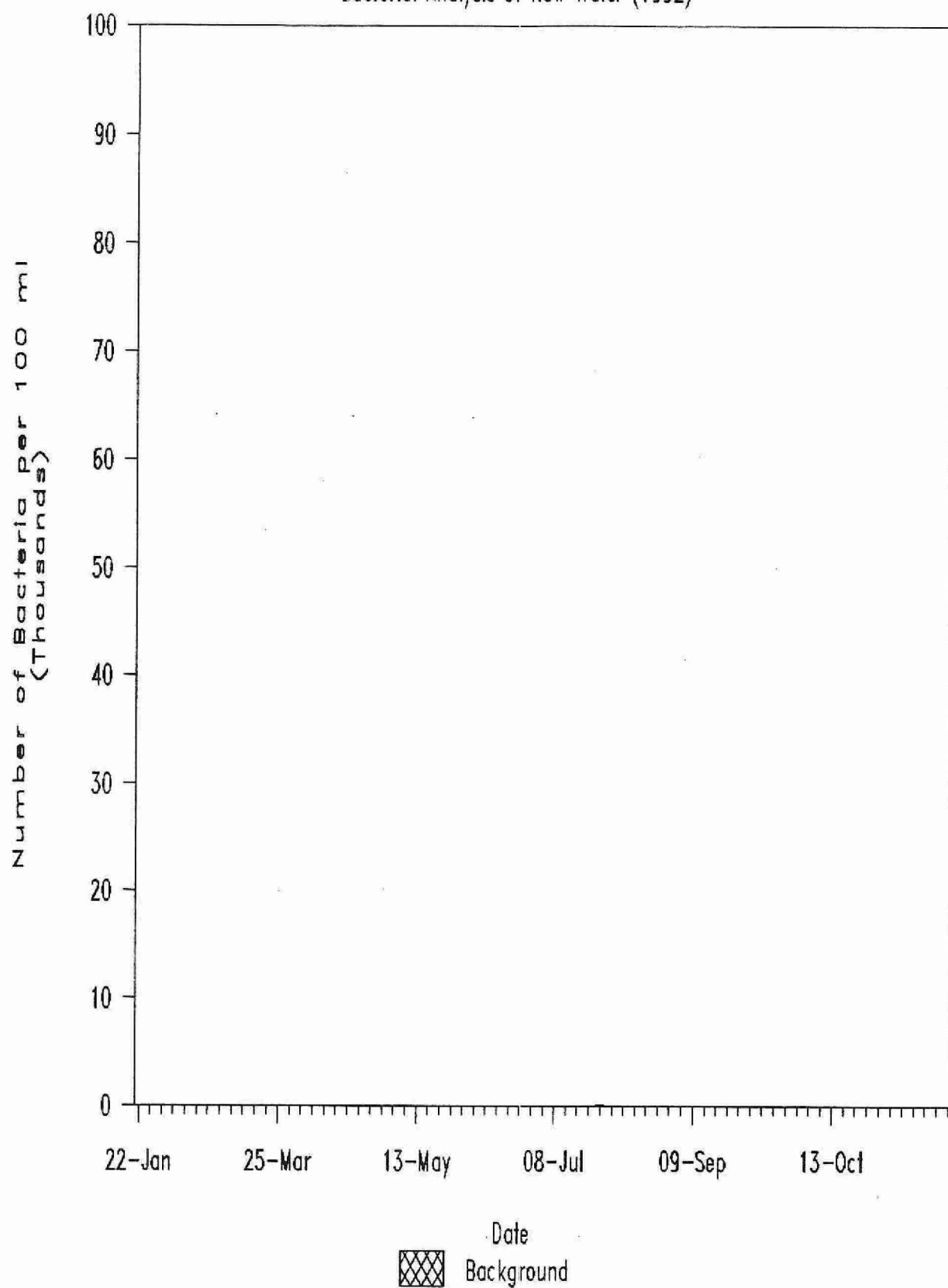
STIRLING

Bacterial Analysis of Raw Water (1992)



STIRLING

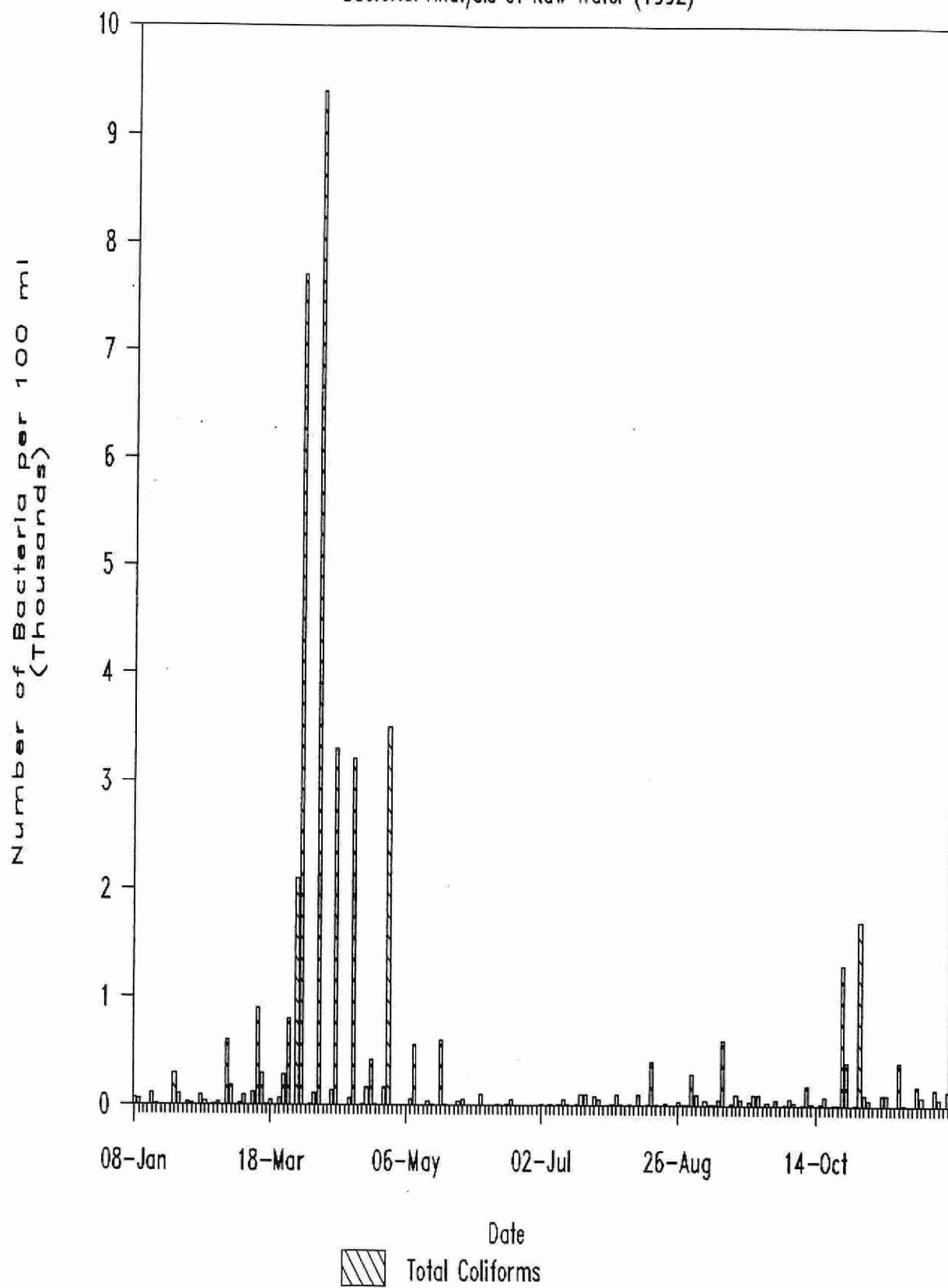
Bacterial Analysis of Raw Water (1992)



TRENTON (CITY)

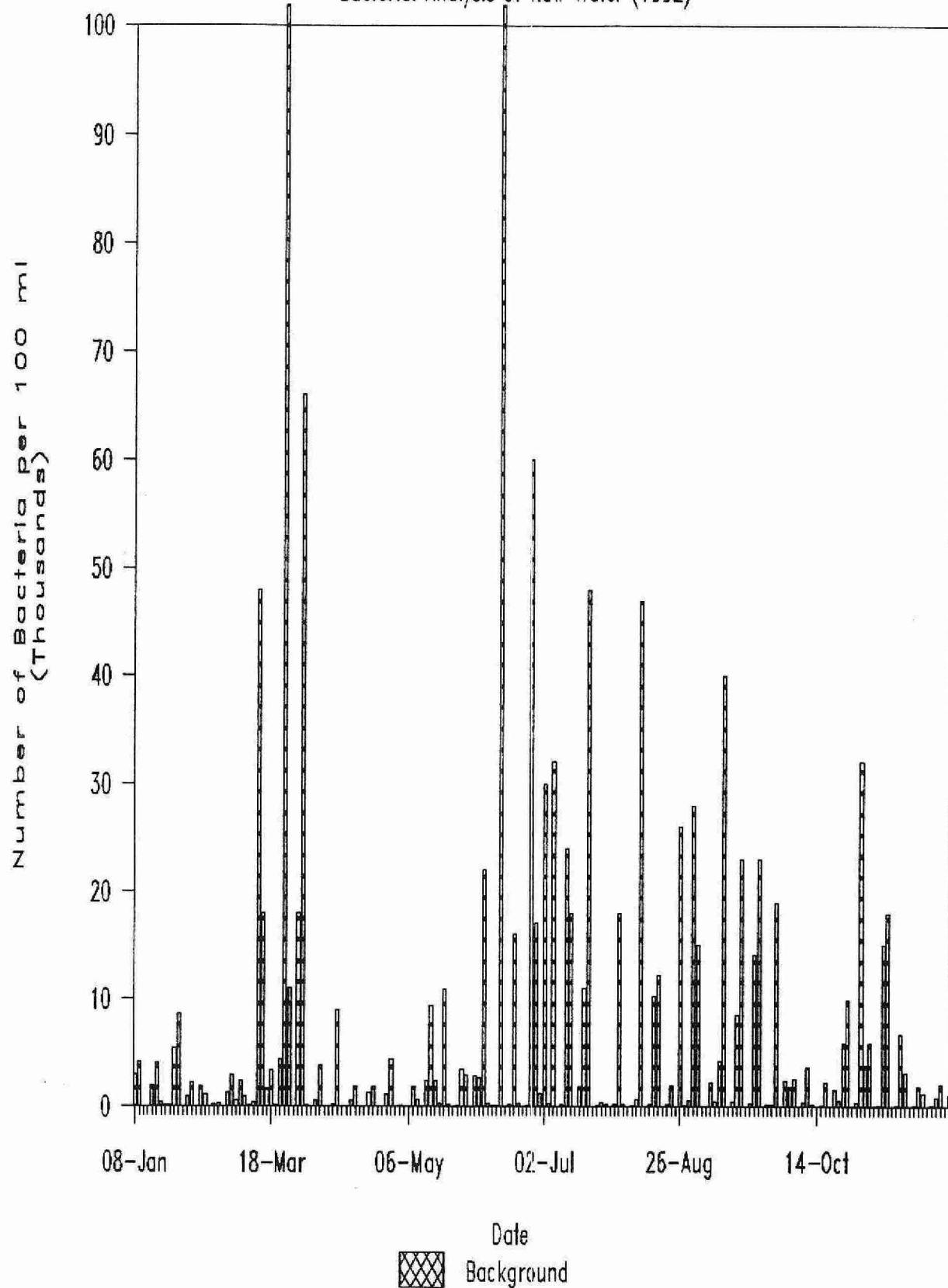
159

Bacterial Analysis of Raw Water (1992)



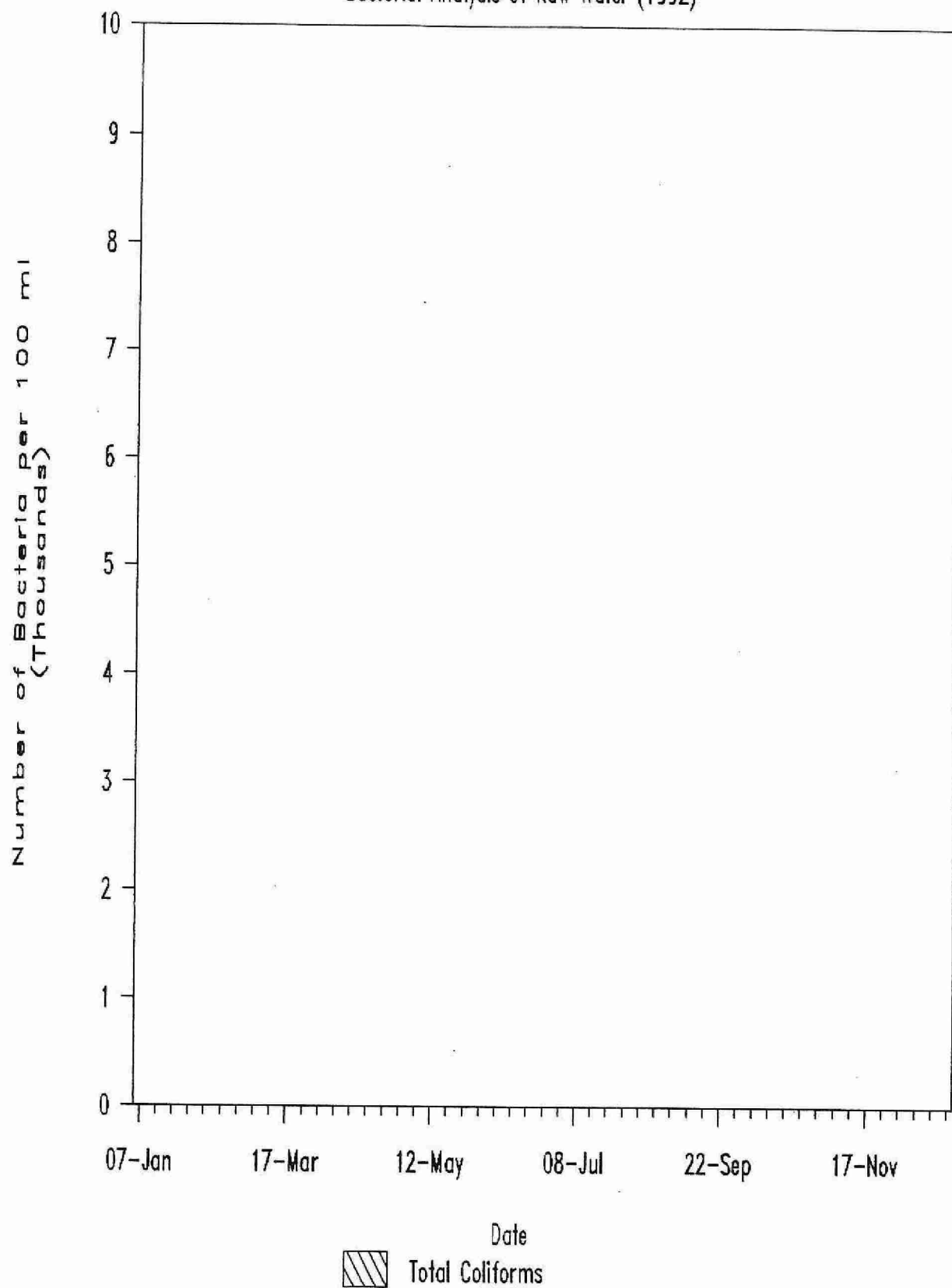
TRENTON (CITY)

Bacterial Analysis of Raw Water (1992)



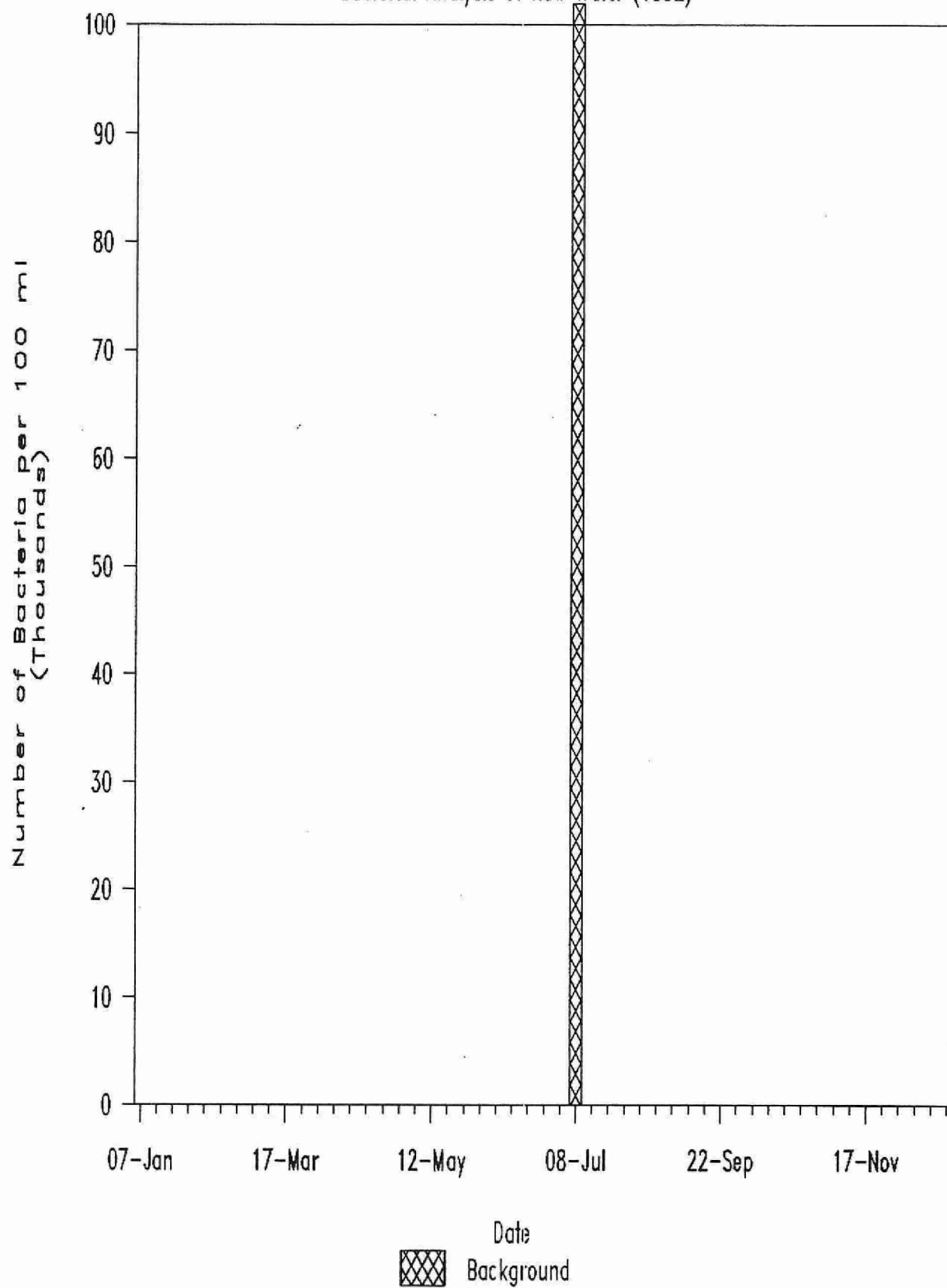
TWEED

Bacterial Analysis of Raw Water (1992)



TWEED

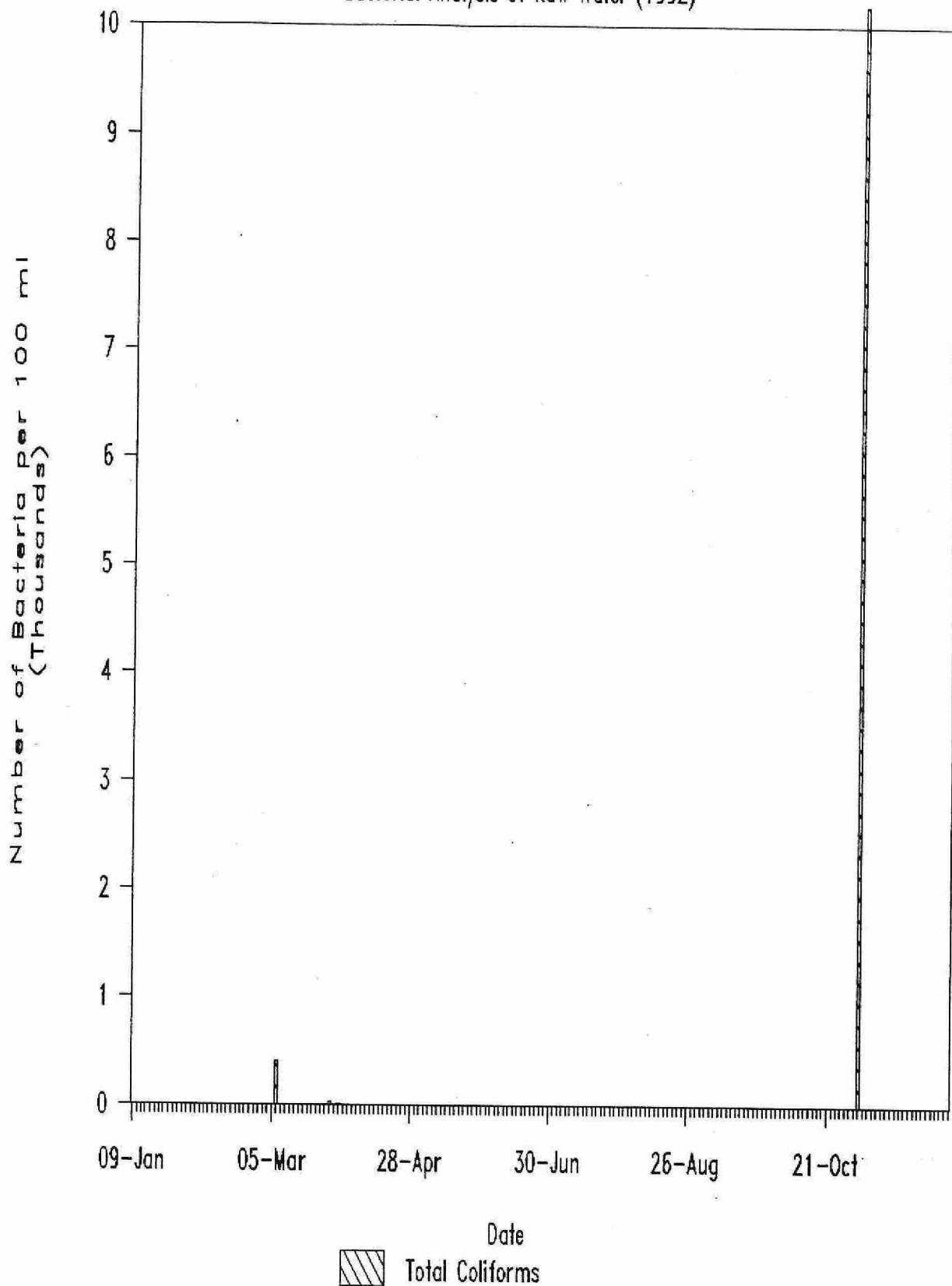
Bacterial Analysis of Raw Water (1992)



VANKLEEK HILL

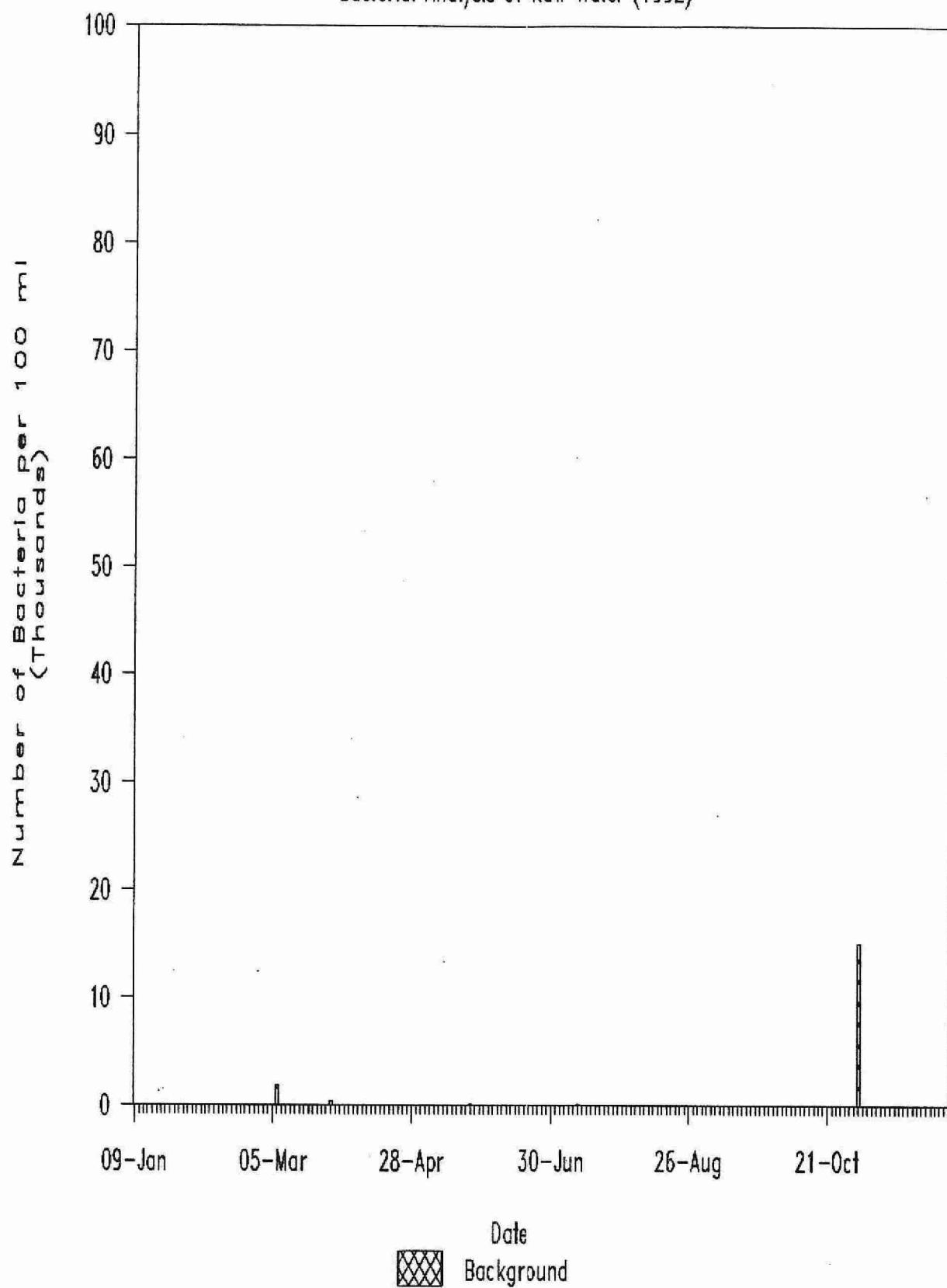
163

Bacterial Analysis of Raw Water (1992)



VANKLEEK HILL

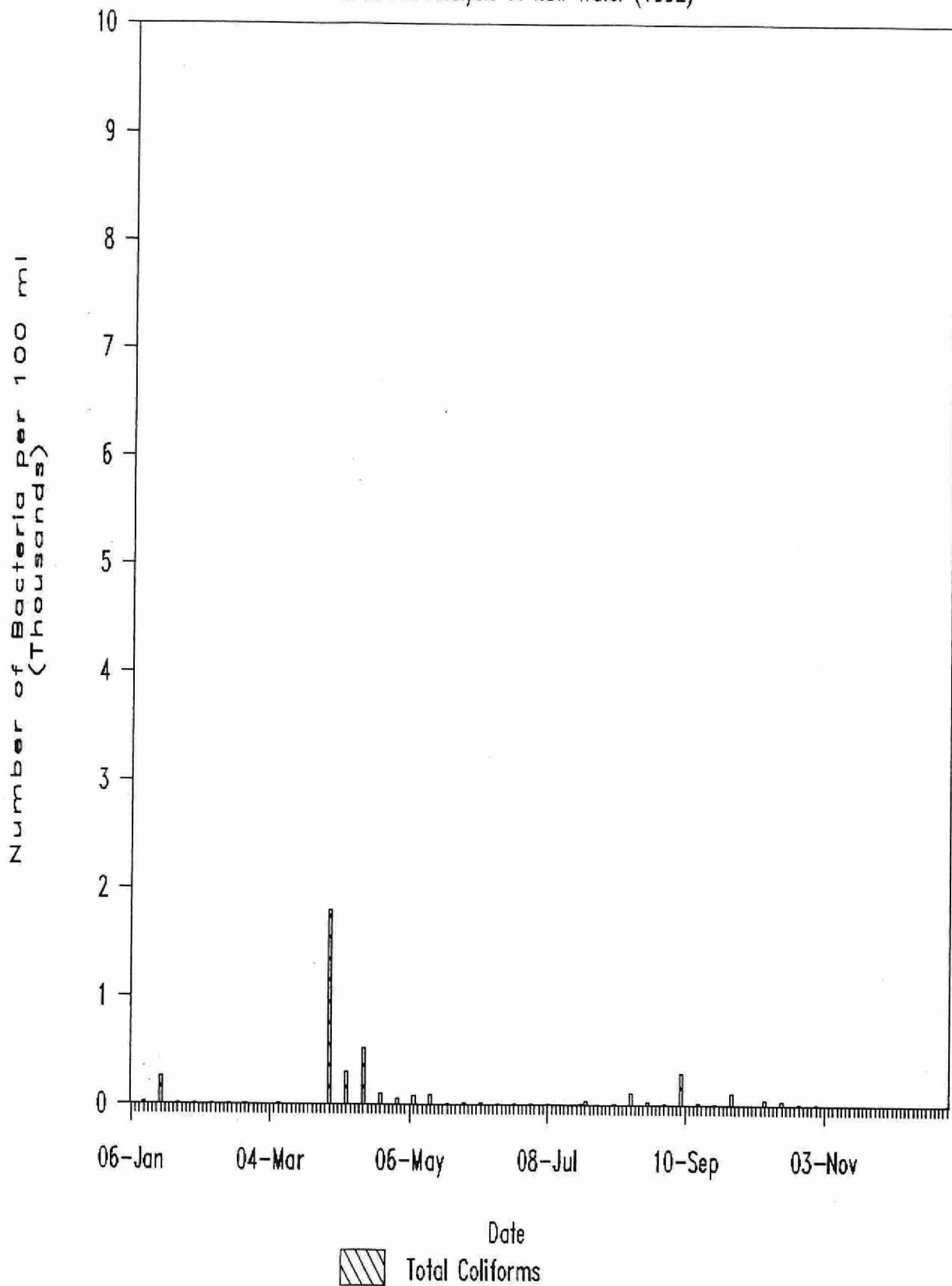
Bacterial Analysis of Raw Water (1992)



WELLINGTON

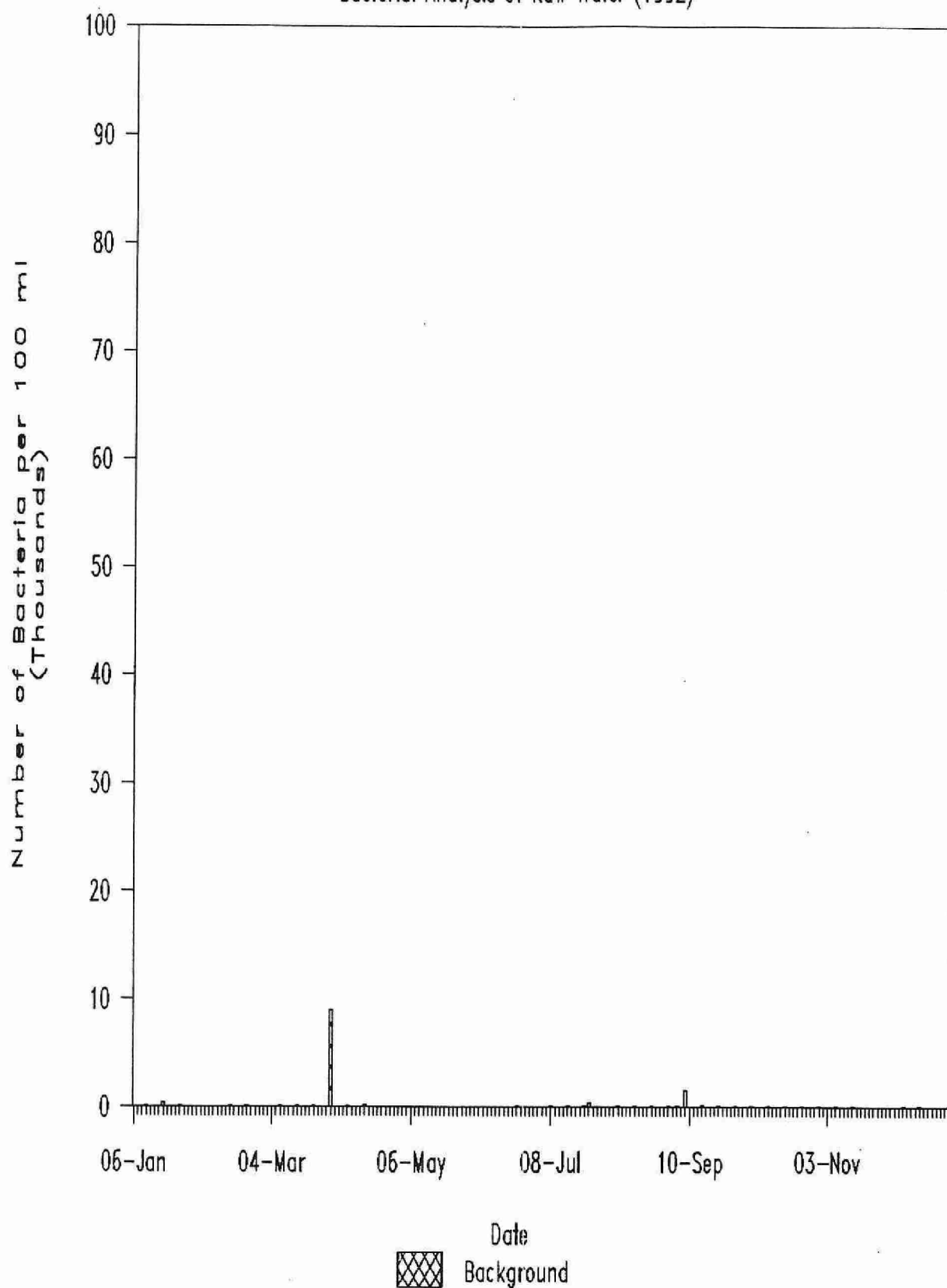
165

Bacterial Analysis of Raw Water (1992)



WELLINGTON

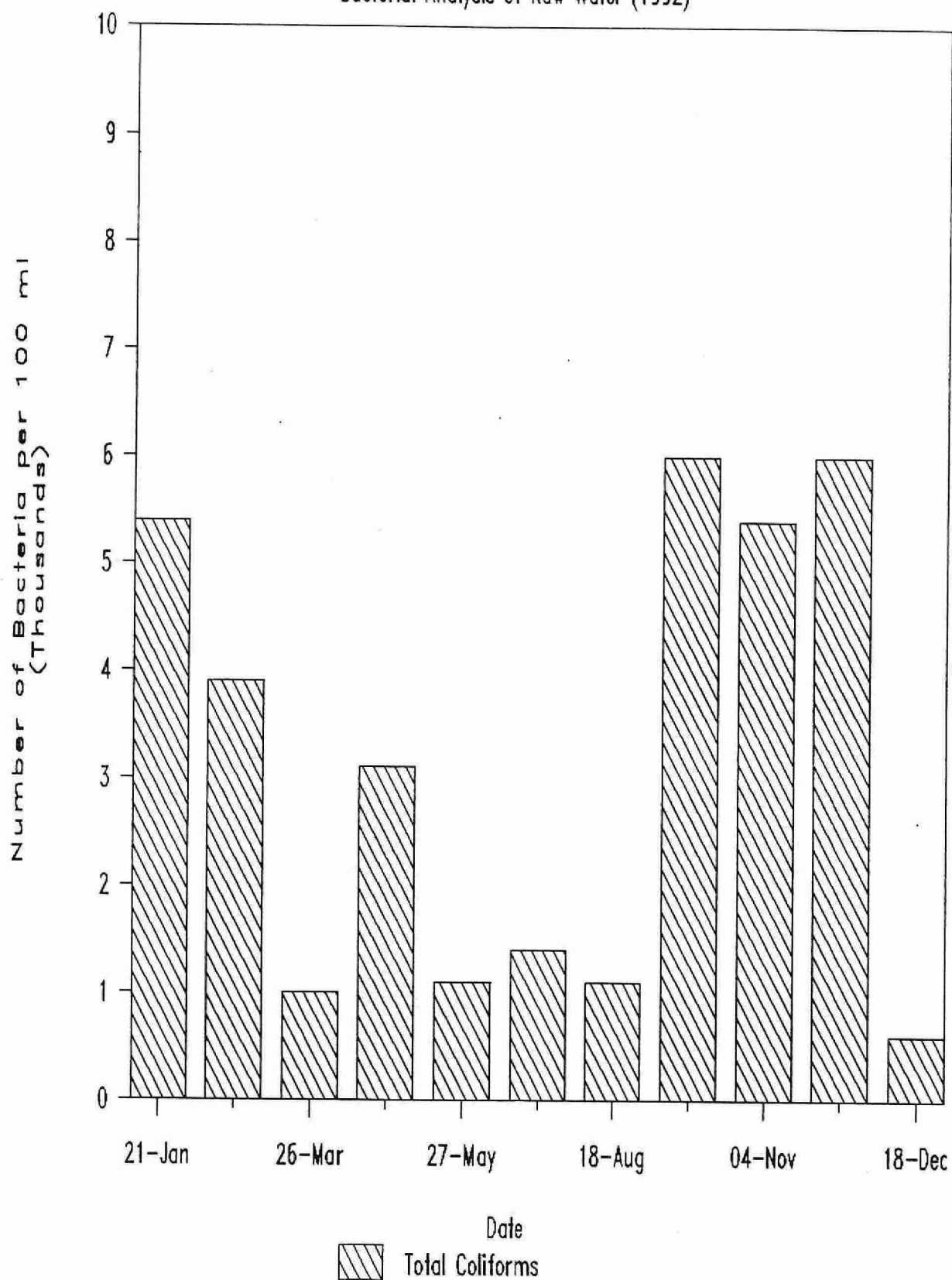
Bacterial Analysis of Raw Water (1992)



WENDOVER

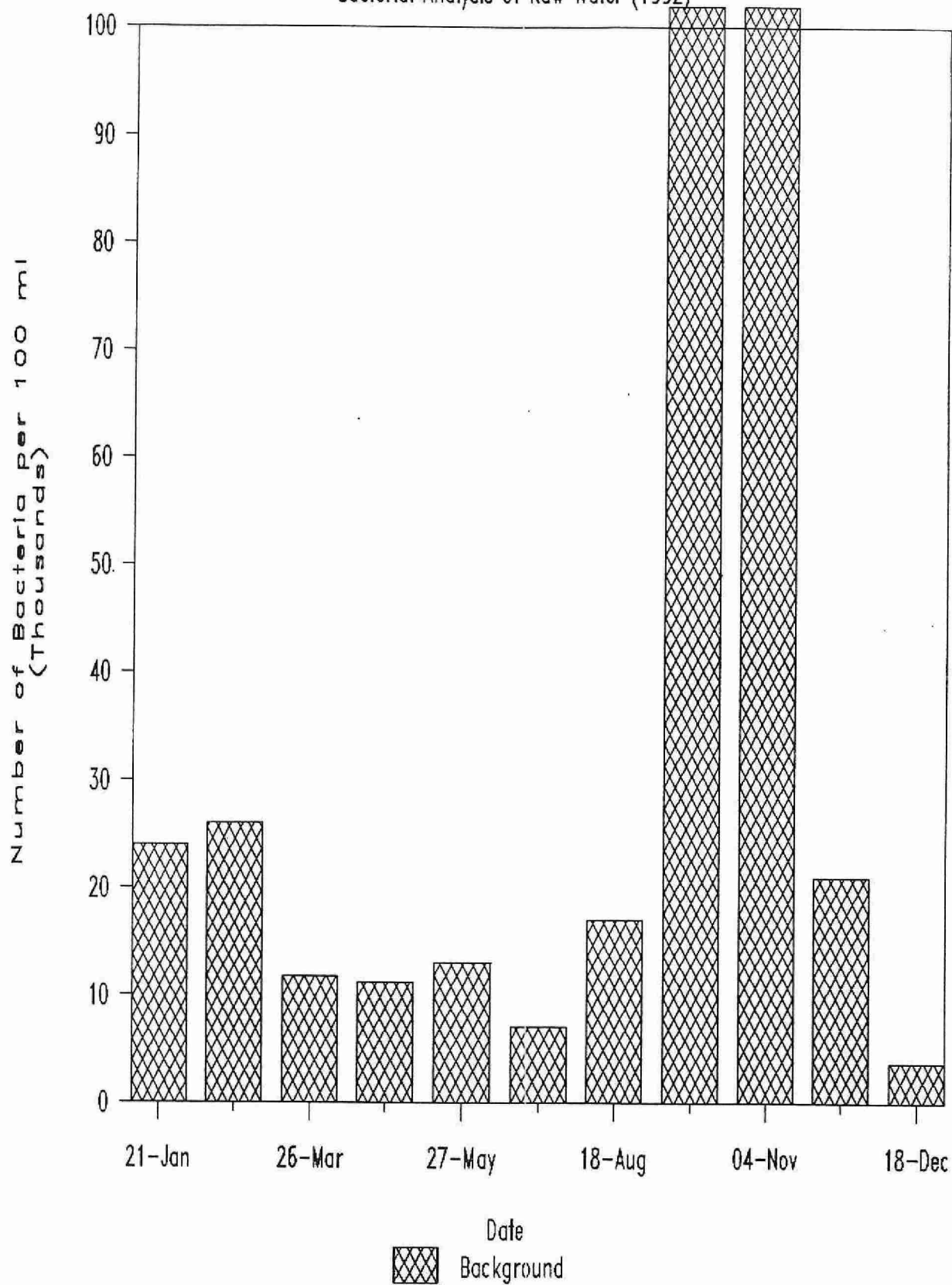
167

Bacterial Analysis of Raw Water (1992)



WENDOVER

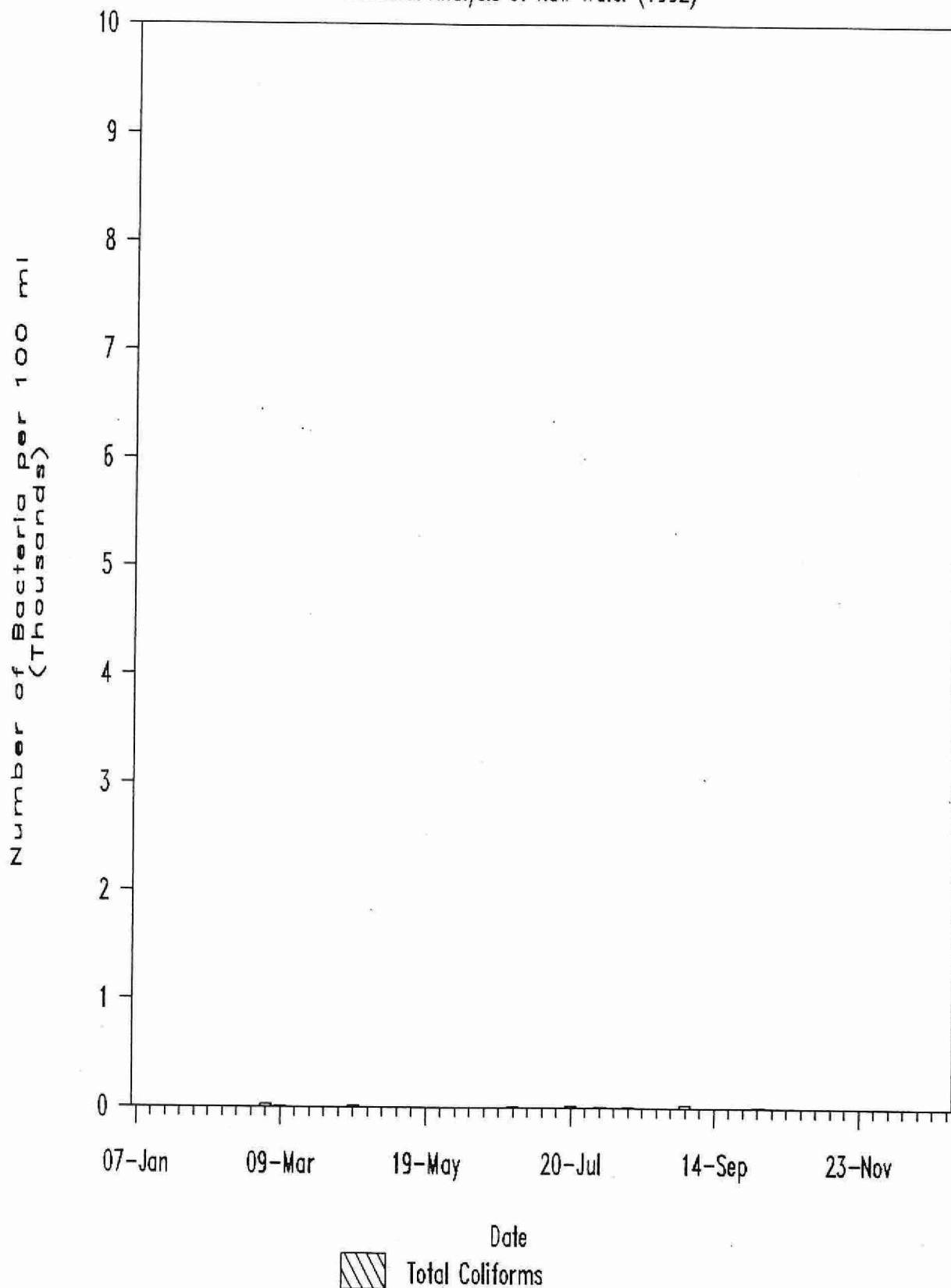
Bacterial Analysis of Raw Water (1992)



WESTPORT

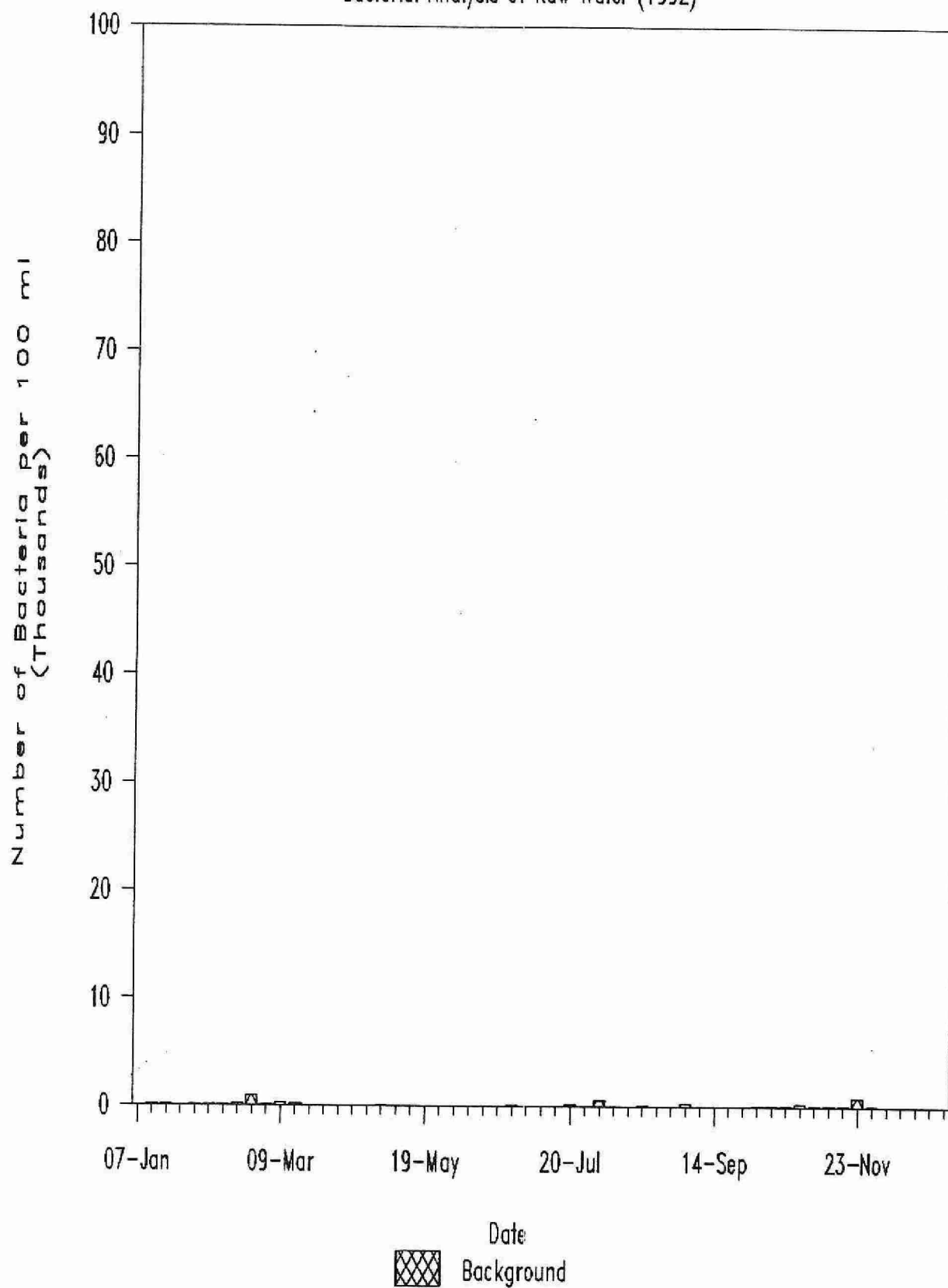
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Bacterial Analysis of Raw Water (1992)



WESTPORT

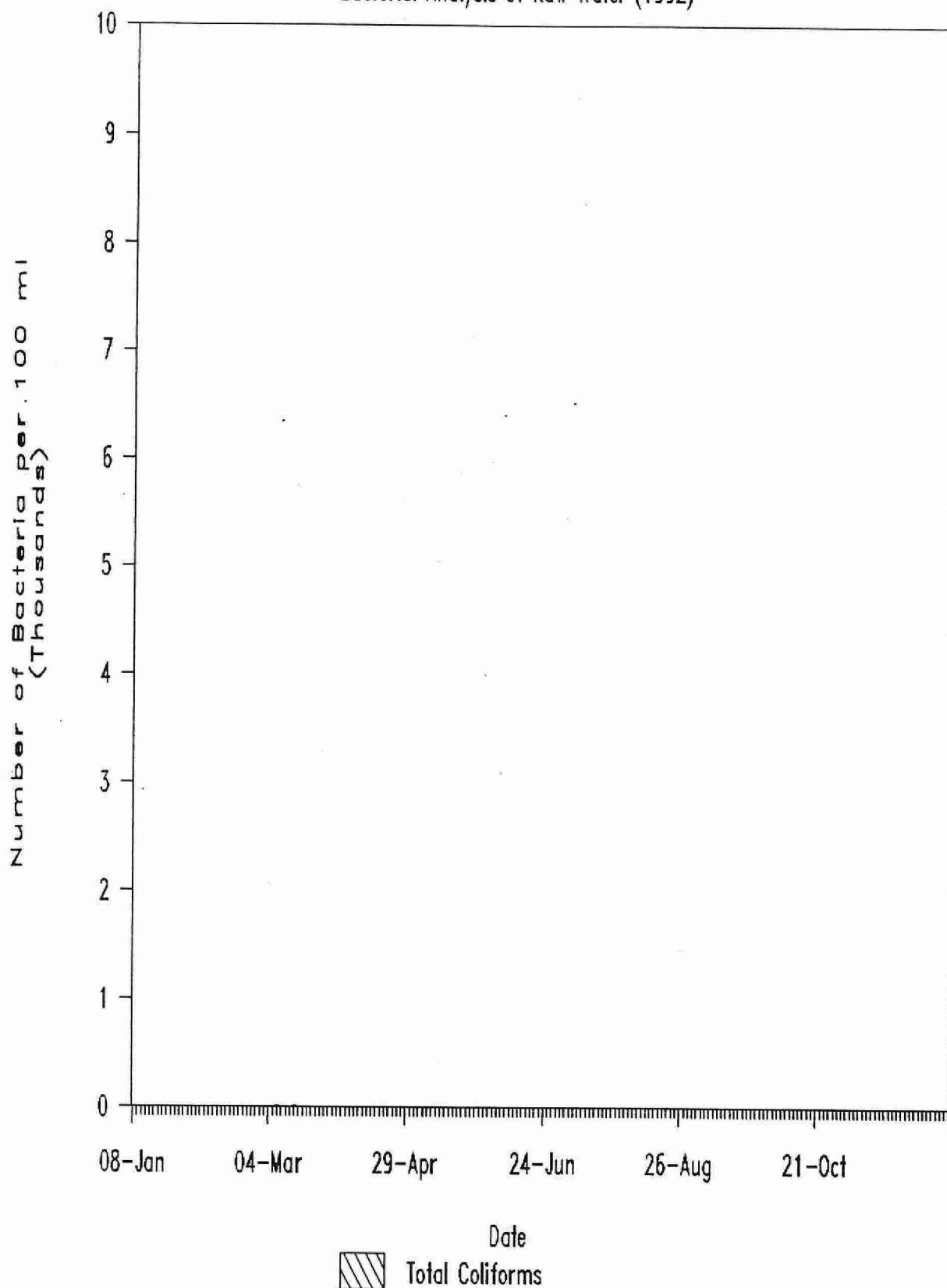
Bacterial Analysis of Raw Water (1992)



WINCHESTER

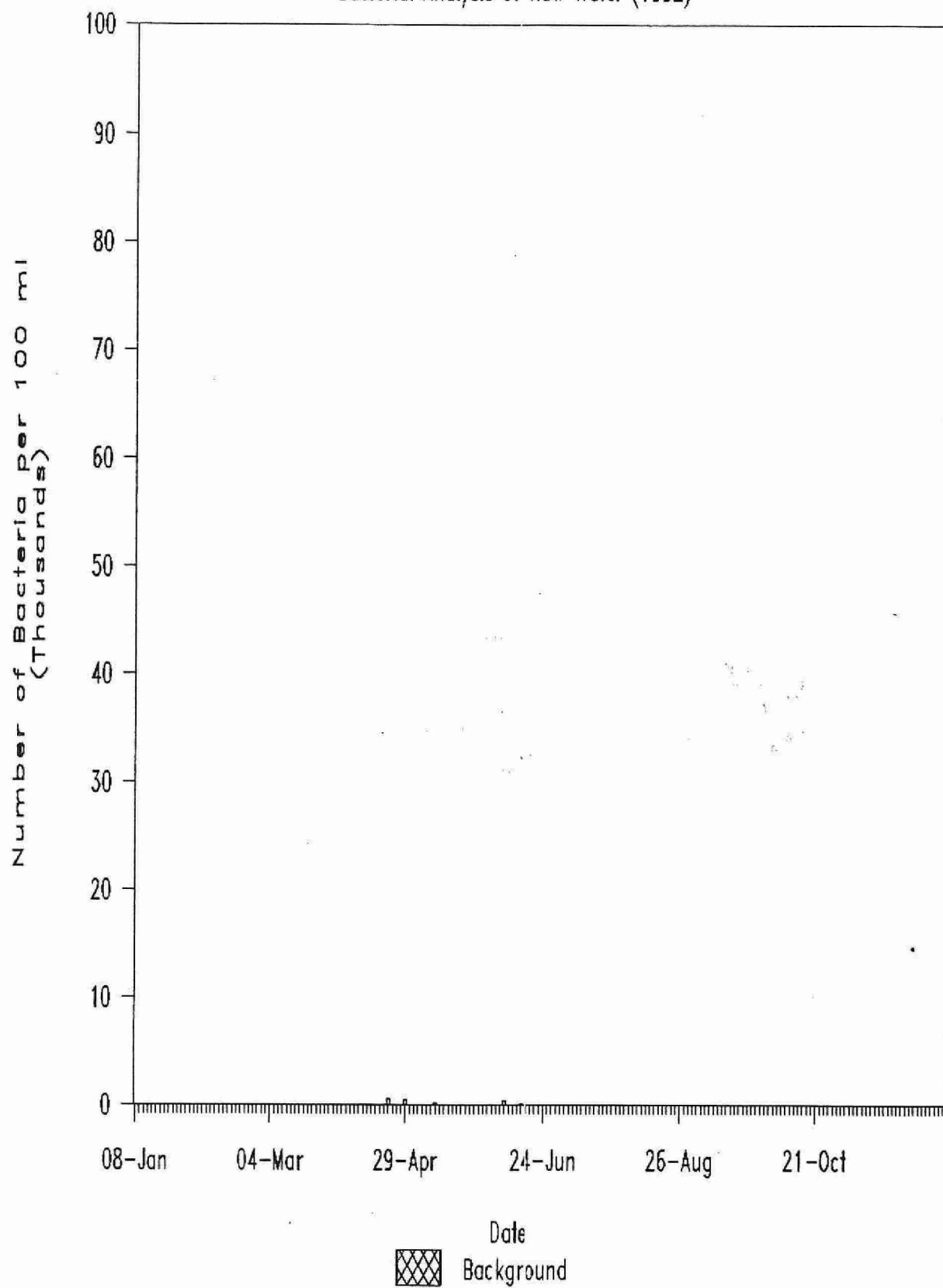
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Bacterial Analysis of Raw Water (1992)



WINCHESTER

Bacterial Analysis of Raw Water (1992)



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